Groundwater Application Review Summary Form

Application # G- 19146

GW Reviewer Stacey Garrison/Travis Brown Date Review Completed: 2/27/2024

Summary of GW Availability and Injury Review:

☒ Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

☐ There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

☒ The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

WATER RESOURCES DEPARTMENT

MEMO **_February 27 2024_**

TO: **Application** G-**_19146_**

FROM: **GW: _Stacey Garrison/Travis Brown_**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ **YES**
☐ **NO**

The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☐ **NO**

Use the Scenic Waterway Condition (Condition 7J)

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is *unable to make a Preponderance of Evidence finding.*

Exercise of this permit is calculated to reduce monthly flows in _[Enter]_ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 2/27/2024
FROM: Groundwater Section Stacey Garrison/Travis Brown
Reviewer's Name
SUBJECT: Application G- **19146** Supersedes review of
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation**.

A. GENERAL INFORMATION: Applicant's Name: **J and J Family LLC** County: **Marion**

A1. Applicant(s) seek(s) 2.07 cfs from 8 well(s) in the Willamette Basin, Mainstem Willamette subbasin

A2. Proposed use irrigation Seasonality: March 1-October 31

A3. Well and aquifer data **(attach and number logs for existing wells; mark proposed wells as such under logid)**:

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	MARI 54600	1	CRB	0.95	7S/2W-34 NE-NE	724' N, 375' W fr NW cor DLC 46[b]
2	MARI 7750	2	CRB	0.95	7S/2W-27 NW-SE	1380' N, 1850' W fr SE cor S 27[b]
3	MARI 16624	3	CRB	0.95	7S/2W-35 NW-NW	700' N, 420' E fr NW cor DLC 46[b]
4	MARI 15392	4	CRB	0.44	7S/2W-25 SW-NW	50' N, 100' W fr Int 'L'cor DLC 65[b]
5	Proposed	5	CRB[a]	0.44	7S/2W-25 NW-SW	1550' N, 350' E fr SE cor S 26[b]
6	Proposed	6	Alluvial[a]	2.07 Mar-Jun, 1.09 Jul, 0.67 Aug-Oct	6S/2W-24 SE-NE	1450' S, 950' W fr NE cor S 24[b]
7	MARI 58808	7	Alluvial	2.07 Mar-Jun, 1.09 Jul, 0.67 Aug-Oct	6S/2W-24 NE-SE	660' S, 80' W fr E ¼ cor S 24[b]
8	MARI 4414	8	Alluvial	2.07 Mar-Jun, 1.09 Jul, 0.67 Aug-Oct	6S/2W-24 NW-SE	660' S, 1550' W fr E ¼ cor S 24[b]

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	249[c]	8	70.6	3/31/2022	400	0-112	+1-112	0-400	295-395, perf.	450		air
2	230[c]	55	56.06	3/23/2022	400	0-20, 150-160	+1-160			500-600		air
3	263[c]	136	105	6/3/1989	258	0-79	+1-79		223-258, perf.	250		air
4	233[c]	118	45.95	3/23/2022	347	0-83	+1.5-83			600		air
5	270[c]				350±[a]	0-50[d]						
6	196[c]				240±[a]	0-18						
7	200[c]	110	60.56	3/23/2022	239	0-58	+1.5-238		150-230, perf.	960	35	pump
8	204[c]	92	50	7/6/1960	142	0-6	0-142		112-142, perf.	500	20	pump

Use data from application for proposed wells.

A4. **Comments:** The POAs/POUs are located 2 miles east of Salem, Oregon. Applicant proposes to irrigate at various rates: POAs 1, 2, and 3 at a rate of 0.95 cfs (426 gpm) on up to 75.8 acres between March 1 and October 31 with total annual volume limited to 189.5 af/year; POAs 4 and 5 at a rate of 0.44 cfs (197.5 gpm) on up to 34.9 acres between March 1 and October 31 with a total annual volume limited to 87.25 af/year; POAs 6, 7, and 8 on up to 165.2 acres with a total annual volume limited to 413 af/year and at variable rates of 2.07 cfs (929 gpm) between March 1 and June 30, then 1.09 cfs (489 gpm) in July, and 0.67 cfs (301 gpm) between August 1 and October 31.
POA 1 (MARI 54600) is also authorized for: Nursery Use on 41 ac at a maximum rate of 1 cfs and a maximum annual volume of 205 af under Cert 79611 (priority date 8/24/1999); Irrigation Use on 17.2 ac and Supplemental Irrigation Use on 23.4 ac at a maximum rate of 0.09 cfs and a maximum annual volume of 101.5 af under Permit G 17778 (priority date

10/21/2015)[e]. POA 1 will therefore be assessed at a total combined rate of **2.04 cfs** (~916 gpm) and a **maximum annual volume of 496 af**. POA 2 (MARI 7750) is also authorized for Irrigation Use on 154.1 ac at a maximum rate of 1.93 cfs (1.51 cfs with priority date of 12/4/1989, 0.42 cfs with priority date of 6/18/1990) and a maximum annual volume of 385.25 af under Cert 72183. POA 2 will therefore be assessed at a total combined rate of **2.88 cfs** (~1,293 gpm) and a **maximum annual volume of 574.75 af**. POA 4 (MARI 15392) is also authorized for: Irrigation Use on 49.3 ac at a maximum rate of 0.62 cfs (278 gpm) and a maximum annual volume of 123.25 af under Cert 79607 (priority date 12/11/1990); Irrigation Use on 23 ac at a maximum rate of 0.288 cfs (129 gpm) and a maximum annual volume of 57.5 af under T-12314 (priority date 1/23/1997). POA 4 will therefore be assessed at a total combined rate of **1.348 cfs** (605 gpm) and a **maximum annual volume of 268 af**. POA 8 (MARI 4414) is also authorized for: Irrigation on 26.8 ac at a maximum rate of 0.34 cfs (153 gpm) and a maximum annual volume of 67 af under Cert 31800 (priority date 7/8/1960); Irrigation Use on 13.3 ac at a maximum rate of 0.17 cfs (76 gpm) and a maximum annual volume of 33.25 af under Cert 34791 (priority date 4/2/1962). POA 8 will therefore be assessed at a total combined rate of **2.58 cfs (1,158 gpm) between March 1 and June 30**, then **1.6 cfs (718 gpm) in July**, and **1.18 cfs (530 gpm) between August 1 and October 31** and a **maximum annual volume of 513.25 af/year**.

[a] Proposed well construction from applicant.

[b] There appears to be a discrepancy in the Public Lands Survey System (PLSS) projection used in the application map and that used by Department. The "metes-and-bounds" location descriptions provided in the application for the POAs are: 50 ft northwest (POA 5), and 70 ft east (POAs 6 and 8) of the mapped locations; the mapped locations are used for this review. For POAs 1, 2, 4 and 7 the Department's existing mapped locations are used for this review.

[c] Well head elevation estimated based on LIDAR measurements at well locations (Watershed Sciences, 2009).

[d] The applicant proposes a seal depth of at least 18 ft, however, in accordance with Special Conditions for Basalt Wells in the Willamette Valley, seal must be at least 50 ft (see Section B3, below). Furthermore, additional requirements in OARs 690-200 and 690-210 apply, i.e., 690-210-0155(1):"sealed at least five feet into the confining interval immediately overlying the artesian water-bearing zone".

[e] POA 1 is authorized for the full rate of 0.51 cfs under Permit G-17778, however this permit has another POA (MARI 62761) with a specified maximum rate of 0.42 cfs. For Permit G-17778, a rate of 0.09 cfs is used in this review for Well 1 (MARI 54600) under the assumption that the remaining 0.42 cfs would be supplied by MARI 62761.

A5. ☐ **Provisions of the** Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, *or* ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: The existing and proposed POAs develop confined aquifers; therefore, per OAR 690-502-0240, the relevant Willamette Basin Rules (OAR 690-502-0050) do not apply.

A6. ☐ **Well(s) #** _____ tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **NA**
Comments: NA

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is** over appropriated, ☒ **is not** over appropriated, *or* ☐ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☒ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☒ **will not** *or* ☐ **will** likely to **be available within the capacity of the groundwater resource**; or

d. ☐ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:

i. ☒ The permit should contain condition #(s) **7i (Willamette basalt condition), large water use reporting for POAs 1, 2, 3, 4 and 5**; **7n (Large Water Use) for POAs 6, 7 and 8.**

ii. ☒ The permit should be conditioned as indicated in item 2 below.

iii. ☒ The permit should contain special condition(s) as indicated in item 3 below;

B2. a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;

c. ☒ **Condition** to allow groundwater production only from the **CRBG** groundwater reservoir for POAs 1, 2, 3, 4, and 5; only from the **alluvial** groundwater reservoir for POAs 6, 7, and 8 ~~between approximately _____ ft. and _____ ft. below land surface;~~

d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Special Conditions:** The conditions detailed in B1(d)(i) and B2(c), above, are recommended for any permit issued pursuant to this application in order to protect the groundwater resource and senior users. In addition, the following Special Conditions should be applied to the CRBG wells, POAs 1, 2, 3, 4, and 5:

1. Each basalt well shall be cased and continuously sealed from land surface to a depth of at least 50 feet to preclude hydraulic connection to nearby streams.
2. Any well authorized as a Point of Appropriation (POA) under this or subsequent permits shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department Hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval. Single aquifer completion for any well with an open interval greater than 100 ft should be demonstrated to the satisfaction of the Department Hydrogeologists prior to authorization as a POA under this or subsequent permits.

   If, during well construction or repair, it becomes apparent that the well can be constructed to eliminate aquifer commingling or interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/Hydrology Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any new permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.
3. For any well constructed under this or subsequent permits, a dedicated water-level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water-level measurements.
4. For any wells constructed or deepened under this or subsequent permits, the applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10 ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.
5. If any geologic and hydrogeologic reports are completed for the permittee during the development of permitted wells, including geophysical well logs and borehole video logs, then copies of the reports shall be provided to the Department. Except for borehole video logs, two paper copies or a single electronic copy shall be provided of each report. Digital tables of any data shall be provided upon request.

Groundwater availability remarks: POAs 1, 2, 3, 4 (MARI 54600, MARI 7750, MARI 16624, MARI 15392), and proposed POA 5 utilize water-bearing zones (WBZs) within the Columbia River Basalt Group (CRBG). Aquifers in the

CRBG are typically thin interflow zones between lava flows and confined by thicker flow interiors that have low porosity and low permeability (Conlon et al 2005, Gannett & Caldwell 1998, Reidel et al 2002). The interconnected pore spaces of the thin interflow zones have limited storage space for water and are thus more likely to experience rapid drawdown (Tolan & Beeson 2001). Well logs near the proposed location for POA 5 (MARI 59786, MARI 7682) indicate multiple WBZs in the CRBG between 200 and -50 ft msl. Comparison of the existing POA well logs with local lithology indicates the POAs likely utilize water from the Sentinel Bluffs and/or Winter Water members of the Grand Ronde Basalt, or Basalt of Silver Falls from the Frenchman Springs member (Tolan & Beeson 2001). The POAs are in an area deformed by faults, possibly resulting in compartmentalization of aquifers (Tolan & Beeson 2001). There is a concealed northeast trending fault that separates POA 2 from POAs 1 and 3; two northwest-trending faults parallel one another and flank POAs 1, 2 and 3 approximately 0.5 miles to the east and 0.75 miles to the west; another pair of northwest trending faults flank POAs 4 and 5 (Tolan & Beeson 2001). The degree of compartmentalization due to nearby faults, which is unknown at this time, may exacerbate well-to-well interference and longer-term water level declines in the local basalt aquifer.

POAs 7, 8 (MARI 58808 and MARI 4414), and proposed POA 6 are located on Pleistocene alluvial deposits primarily associated with older terrace and fan deposits as well as fine sediments from the Missoula Floods (Tolan et al 1999). Terrace deposit formations can alternate between fine and coarse-grained layers and can be discontinuous (Gannet & Caldwell 1998). Hampton (1972) mapped this area as Willamette Silt with a thickness of approximately 100 ft, and the underlying Troutdale Formation ranging from 100 to 150 ft thick. This is consistent with the yellow and blue clays recorded in nearby well logs (MARI 3219, MARI 3233, MARI 3241, MARI 3986, MARI 3990, MARI 4412, MARI 4423, MARI 4424, MARI 58808) as the Willamette Silt is typified as sand or silty clay, in tones of blue and yellow (Hampton 1972, Conlon et al 2005). The POAs utilize WBZs in the Willamette Aquifer of the Middle Sedimentary Unit, with reported layers of sandy clay and blue clay overlying the utilized WBZs (Gannett & Caldwell 1998, Conlon et al 2005, Swanson et al 1993). There is a wide variability in hydraulic characteristics of the Willamette aquifer, owing to the variety of compositions and degree of consolidation (O'Connor et al 2001). Given the proposed depth of POA 6, it is also likely to utilize a WBZ in the Willamette Aquifer. The thickness of WBZs using the Willamette Aquifer in surrounding wells varies from 1 foot to 123 feet in thickness, with pumping rates ranging from 20 to 1,020 gpm (MARI 3523, MARI 4412, MARI 4414, MARI 4416, MARI 4423, MARI 4424, MARI 18497, MARI 60440).

For POA 1, the existing rate from Cert 79611 is 1.0 cfs and from Permit G17778 is 0.09 cfs. If all authorizations are utilized, including the proposed rate of 0.95 cfs for this review, total pumping rate is 2.04 cfs, or ~916 gpm. For POA 2, the existing rate from Cert 72183 is 1.93 cfs. If all authorizations are utilized, including the proposed rate of 0.95 cfs for this review, total pumping rate is 2.88 cfs or ~ 1,293 gpm. POA 3 does not have any known pre-existing water right claims, and the rate is the 0.95 cfs, or ~ 426 gpm. For POA 4, the existing rate from Cert 79607 is 0.64 cfs and from T12314 is 0.288 cfs. If all authorizations are utilized, including the proposed rate of 0.44 cfs for this review, total pumping rate is 1.368 cfs, or ~ 614 gpm. POAs 5 and 6 are new wells with no other existing authorizations, the rates for this review are the proposed rates: 0.44 cfs or 197.5 gpm for POA 5, and a maximum rate of 2.07 cfs or 929 gpm for POA 6. POA 7 does not have any known pre-existing water right claims, and the maximum rate for this review is 2.07 cfs or ~930 gpm. For POA 8, the existing rate from Cert 31800 is 0.34 cfs and from Cert 34791 is 0.17 cfs. If all authorizations are utilized, including the maximum proposed rate of 2.07 cfs for this review, total pumping rate is 2.58 cfs, or ~ 1,158 gpm.

The yield for POA 1 (MARI 54600) recorded on the well log is 450 gpm, and for POAs 2 and 4 (MARI 7750, MARI 15392) is 600 gpm, however these air tests may not be reliable. Department-reviewed pump tests on POAs 1, 2 and 4 provide more accurate estimates of maximum yield rates: 1,230 gpm for POA 1; 2,398 gpm for POA 2; 2,929 gpm for POA 4. The yield for POA 3 (MARI 16624) recorded on the well log is 250 gpm, which is only 59 percent of the total pumping rate for this review; POA 3 may not be capable of supplying the proposed rate. POA 7 underwent a 4 hour pump test, demonstrating a yield of 960 gpm with 35 ft of drawdown. POA 8 underwent a 5 hour pump test, demonstrating a yield of 500 gpm with 20 ft of drawdown; this rate is only 43 percent of the proposed rate, POA 8 may not be capable of supplying the proposed rate. A review of local well statistics was completed for proposed POAs 5 and 6; for POA 5 (see Well Statistics 7S/2W-25 and surrounding sections), the median rate was 40 gpm and the maximum was 1,000 gpm; for POA 6 (see Well Statistics 6S/2W-24 and surrounding sections), the median rate was 120 gpm and the maximum was 2,000 gpm. For POA 5, the proposed rate is 494 percent of the median and 20 percent of the maximum yield for wells in the area. For POA 6, the proposed rate is 774 percent of the median and 46 percent of the maximum yields for wells in the area. POAs 1, 2, 4, 5, 6, and 7 appear capable of supplying the proposed rate.

Water level trends for wells near (0 to 2 miles) POAs 1, 2, 3, 4 and 5 that utilize the CRBG and have SWLs within 100 ft in elevation to the POAs' SWLs are declining (see Water Levels Measurements in Nearby Wells-Wells 1, 2, 3, 4 and 5). Of the 13 wells included, 4 have declined between 1 and 2 ft in the prior 10 years (MARI 7750, MARI 7999, MARI 8199, 18255). The remaining 9 wells have declined between 2 and 5 ft in the prior 10 years. There is not a preponderance of evidence to support that the water levels in the CRBG groundwater reservoir are declined excessively or excessively declining; therefore, the groundwater reservoir is not over-appropriated.

Water level trends for wells near (0 to 2 miles) POAs 6, 7, and 8 that utilize the alluvial aquifer are declining (see Water Levels Measurements in Nearby Wells-Wells 6, 7, and 8). Of the 6 wells included, 1 has declined between 1 and 2 ft in the prior 10 years (MARI 17256). The remaining 5 wells have declined between 4 and 10 ft in the prior 10 years. Well 2 (MARI 7750), Well 4 (MARI 15392), and Well 7 (MARI 58808) have extended datasets: MARI 7750 has declined 22.5 ft since 1992; MARI 15392 has declined 5.45 ft since 1992; MARI 58808 has declined 8.61 ft since 2006 (see Water Levels Measurements MARI 7750, MARI 15392, and MARI 58808). There is not a preponderance of evidence to support that the water levels in the alluvial groundwater reservoir are declined excessively or excessively declining; therefore, the groundwater reservoir is not over-appropriated.

The nearest CRB groundwater user to POA 1 is MARI 19360 (an exempt domestic well), located ~223 ft southeast of the POA, at an elevation of ~259 ft msl. The well log does not record the latitude or longitude for MARI 19360, but it is recorded to be located on taxlot 500 at 585 74th Ave SE Salem, Oregon. Due to the domestic use indicated on the well log, it was assumed that MARI 19360 is co-located in the vicinity of the developed structures on taxlot 500. MARI 19360 is completed to a depth of 197 ft bls and with a WBZ at 155-197 ft bls [62-104 ft mls]. The seal of POA 1 extends to 112 ft bls [137 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 19360. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 1). **Results indicate that the proposed use of POA 1 is likely to cause well-to-well interference with MARI 19360 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.**

The nearest CRB groundwater user to POA 2 is MARI 56896 (an exempt domestic well), located ~ 1,357 ft to the south of the POA, at an elevation of ~226 ft msl. The well log does not record the latitude or longitude for MARI 56896, but it is recorded to be located on taxlot 200 at 7235 State St NE Salem, Oregon. The center of the taxlot is the assumed location of MARI 56896. MARI 56896 utilizes a WBZ from 330 to 537 ft bls [-104 to -311 ft msl]. POA 2 has a split seal, with the upper portion extending from the surface to 20 ft bls [230 to 210 ft msl] and the lower portion from 150 to 160 ft bls [70 to 80 ft msl], likely not sealing through the WBZ that MARI 56896 utilizes. It is likely the proposed use would cause some degree of well-to-well interference with MARI 56896. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 2). **Results indicate that the proposed use of POA 2 is likely to cause well-to-well interference with MARI 56896 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.**

The nearest CRB groundwater user to POA 3 is MARI 16615 (an exempt domestic well), located ~ 510 ft to the southwest of the POA, at an elevation of ~283 ft msl. The well log does not record the latitude or longitude for MARI 16615, but it is recorded to be located at 616 74th Ave SE Salem, Oregon. Without additional location information, it was assumed the well is located in the center of the developed area on the taxlot at the indicated address. MARI 16615 utilizes a WBZ from 188 ft bls to the completed depth 200 ft bls [83 to 95 ft msl]. The seal of POA 3 extends to 79 ft bls [184 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 16615. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 3). **Results indicate that the proposed use of POA 3 is likely to cause well-to-well interference with MARI 19360 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.**

The nearest CRB groundwater user to POA 4 is MARI 66833 (an exempt domestic well) located ~313 ft to the southeast of the POA, at an elevation of 240 ft msl. MARI 66833 utilizes multiple WBZs from 130 to 283 ft bls [-43 to 110 ft msl]. The seal of the POA extends to 83 ft bls [150 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 66833. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 4). **Results indicate that the proposed use of POA 4 is likely to cause well-to-well interference with MARI 66833 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.**

The nearest CRB groundwater user to the proposed location for POA 5 is MARI 7682 (an exempt domestic well), located ~308 ft to the southeast of the POA, at an elevation of 272 ft msl. The well log does not record the latitude or longitude for MARI 7682, but the owner name and location matches taxlot 500. Without additional location information, it was assumed the well is located at the center of the taxlot. MARI 7682 utilizes a WBZ from 76 to 128 ft bls [144 to 196 ft msl]. The proposed seal depth of 50 ft bls [220 ft msl] may be adequate for POA 5, as the well log for MARI 7682 reports a confining layer of hard gray basalt from 37 to 76 ft bls [196-235 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 7682. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 5). Results indicate that the proposed use of POA 5 is not likely to cause well-to-well interference with MARI 7682 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.

The nearest alluvial groundwater user to the proposed location for POA 6 is MARI 4416 (an exempt domestic well), located ~613 ft to the northwest of the POA, at an elevation of 195 ft msl. The well log does not record the latitude or longitude for MARI 4416, but the owner name, address, and location matches taxlot 900. Without additional location information, it was assumed the well is located at the center of the developed portion of the taxlot. MARI 4416 utilizes a WBZ from 125 to 134

ft bls [61 to 70 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 4416. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 6). Results indicate that the proposed use of POA 6 is not likely to cause well-to-well interference with MARI 4416 that exceeds the threshold under the standard condition for alluvial aquifers in the Willamette Basin.

The nearest alluvial groundwater user to POA 7 is MARI 60440 (an exempt domestic well), located ~554 ft to the southeast of the POA, at an elevation of 202 ft msl. MARI 60440 utilizes a WBZ from 90 to 160 ft bls [42 to 112 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 60440. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 7). Results indicate that the proposed use of POA 7 is not likely to cause well-to-well interference with MARI 60440 that exceeds the threshold under the standard condition for alluvial aquifers in the Willamette Basin.

The nearest alluvial groundwater user to POA 8 is MARI 50725 (G-1572 and G-4495 via T-7553 with priority dates 4/11/1960 and 1/24/1969), located ~249 ft to the southwest of the POA, at an elevation of 205 ft msl. MARI 50725 utilizes a WBZ from 68 to 222 ft bls [-17 to 137 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 50725. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 3). Results indicate that the proposed use of POA 8 is not likely to cause well-to-well interference with MARI 50725 that exceeds the threshold under the standard condition for alluvial aquifers in the Willamette Basin.

Based on this analysis of the available data and under the assumptions previously identified, groundwater for the proposed use is not likely available in the amounts requested within the capacity of the resource. If a water right is permitted for this application, the conditions specified in B1.d., B2.c, and B3 are strongly recommended to protect senior users and the groundwater resource.

NOTE: This evaluation considers a conservative scenario for the nearest authorized POA not owned by the applicant. Other authorized POAs in the area may also experience an increase in interference as a result of this application, although to a lesser extent than the scenario evaluated here.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Columbia River Basalt**	☒	☐
2	**Columbia River Basalt**	☒	☐
3	**Columbia River Basalt**	☒	☐
4	**Columbia River Basalt**	☒	☐
5	**Columbia River Basalt**	☒	☐
6	**Alluvial**	☒	☐
7	**Alluvial**	☒	☐
8	**Alluvial**	☒	☐

Basis for aquifer confinement evaluation: A review of the POA well logs identifies consistent confining layers overlying confined aquifers; the SWL is above the bottom of the confining layer, indicating a confined aquifer. For the two proposed wells, POA 5 and POA 6, a review of surrounding well logs indicates confined aquifers.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**Little Pudding River**	**178-182[a]**	**177-337[c]**	**1,597**	☐	☒	☐	☐	☒
2	**1**	**Little Pudding River**	**171-175[a]**	**173-210[c]**	**1,576**	☐	☒	☐	☐	☒
3	**1**	**Little Pudding River**	**158[a]**	**179-350[c]**	**1,122**	☐	☒	☐	☐	☒
4	**1**	**Little Pudding River**	**187-193[a]**	**194-306[c]**	**5,390**	☐	☒	☐	☐	☒
4	**2**	**Unnamed tributary to Pudding River**	**187-193[a]**	**189-225[c]**	**2,190**	☐	☒	☐	☐	☒
4	**6**	**Pudding River**	**187-193[a]**	**185-244[c]**	**5,490**	☐	☒	☐	☐	☒
5	**1**	**Little Pudding River**	**179-207[b]**	**194-306[c]**	**4,095**	☐	☒	☐	☐	☒
5	**2**	**Unnamed tributary to Pudding River**	**179-207[b]**	**190-232[c]**	**2,608**	☐	☒	☐	☐	☒
5	**6**	**Pudding River**	**179-207[b]**	**185-244[c]**	**7,052**	☐	☒	☐	☐	☒
6	**1**	**Little Pudding River**	**145-150[b]**	**125-140[c]**	**7,245**	☒	☐	☐	☐	☒
6	**3**	**Howell Prairie Creek**	**145-150[b]**	**142-165[c]**	**3,583**	☒	☐	☐	☐	☒
6	**4**	**Kraus Creek**	**145-150[b]**	**165[c]**	**5,315**	☐	☒	☐	☐	☒
6	**5**	**Woods Creek**	**145-150[b]**	**133-160[c]**	**5,680**	☒	☐	☐	☐	☒
6	**6**	**Pudding River**	**145-150[b]**	**146-155[c]**	**8,851**	☒	☐	☐	☐	☒
7	**1**	**Little Pudding River**	**139-148[a]**	**125-140[c]**	**8,984**	☒	☐	☐	☐	☒
7	**3**	**Howell Prairie Creek**	**139-148[a]**	**142-165[c]**	**1,694**	☒	☐	☐	☐	☒
7	**4**	**Kraus Creek**	**139-148[a]**	**165[c]**	**6,924**	☐	☒	☐	☐	☒
7	**5**	**Woods Creek**	**139-148[a]**	**133-160[c]**	**6,970**	☒	☐	☐	☐	☒
7	**6**	**Pudding River**	**139-148[a]**	**146-155[c]**	**7,690**	☒	☐	☐	☐	☒
8	**1**	**Little Pudding River**	**154[a]**	**125-140[c]**	**7,610**	☒	☐	☐	☐	☒
8	**3**	**Howell Prairie Creek**	**154[a]**	**142-165[c]**	**2,250**	☒	☐	☐	☐	☒
8	**4**	**Kraus Creek**	**154[a]**	**165[c]**	**7,312**	☐	☒	☐	☐	☒
8	**5**	**Woods Creek**	**154[a]**	**133-160[c]**	**5,400**	☒	☐	☐	☐	☒
8	**6**	**Pudding River**	**154[a]**	**146-155[c]**	**9,200**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: POA 1 (MARI 54600) is continuously sealed into basalt to an elevation of 137 ft msl, a SWL at 178 ft msl, and WBZ from -148 to 54 ft msl. POA 2 (MARI 7750) is sealed to 230 to 210 ft msl and

from 70 to 80 ft msl, a SWL at ~174 ft msl, and WBZs from -145 to -61 ft msl and -12 to 29 ft msl. POA 3 (MARI 16624) is continuously sealed into hard dense basalt to an elevation of 184 ft msl, a SWL at 158 ft msl, and a utilized WBZ from 11 to 17 ft msl. The nearby surface water sources do not appear to have incised through the confining layer overlying the WBZs utilized by the proposed POAs. The aquifer utilized by the POA 1 should be isolated from overlying local streams. Wells 2 and 3 are not continuously cased or sealed into the confining interval that overlies the water-bearing zone utilized by the wells; these wells may not meet well construction standards under OAR 690-210 (see Section D, below). The Little Pudding River (SW 1) flows over the Sentinel Bluffs member of the Grande Ronde Basalt within a mile of POAs 2 and 3; a northwest-trending concealed normal fault, downthrown toward the west, is located between the POAs and the Little Pudding River (Tolan & Beeson 2001). The fault likely provides compartmentalization to isolate the basalt aquifers from the stream.
POA 4 (MARI 15392) is continuously sealed to an elevation of 150 ft msl, a SWL of 187 ft msl, and the highest WBZ from 110 to 115 ft msl. POA 5 (New) is anticipated to be continuously sealed to 220 ft msl with a SWL between 179 to 207 ft msl, and the highest WBZ from 144 to 196 ft msl. The unnamed tributary to the Pudding River (SW 2) and the Pudding River (SW 6) flow over the Holocene alluvial deposits, which are underlain by the Willamette Silt. A northwest-trending fault is down-thrown to the northeast and separates POAs 4 and 5 from SW 2 and SW 6. A CRB well that is closer to SWs 2 and 6, MARI 16667/16655 (3,568 ft to the southeast of POA 4 and 3,027 ft southeast of POA 5), shows WBZs from 12 to 95 ft msl and SWL from 174 to 198 ft msl [a]; the fault likely provides compartmentalization to isolate the basalt aquifers used by POAs 4 and 5 from the streams.
Proposed POA 6 (New) is anticipated to be continuously sealed to 178 ft msl; SWLs in surrounding wells utilizing alluvial aquifers vary from 145 to 150 ft msl. POA 7 is continuously sealed to 142 ft msl with a SWL of 139 to 148 ft msl. POA 8 is continuously sealed to 125 ft msl with a SWL of 154 ft msl. Kraus Creek (SW 4) is at a higher elevation than the local groundwater SWLs, and does not appear to receive discharge from the local alluvial aquifer used by the POAs. The local streambed of the Little Pudding River (SW 1), Howell Prairie Creek (SW 3), Woods Creek (SW 5), and the Pudding River (SW 6) are lower than the groundwater SWL, indicating the local groundwater is likely discharging to these SWs. The surface water drainages have not incised below the elevation of the WBZs of the alluvial aquifer-sourced POAs. Hydraulic connection to nearby streams is likely but anticipated to be inefficient due to the horizontal distance and the low vertical permeability of the overlying fine-grained sediments.
[a] Groundwater elevation calculated from static water level reported in well logs and/or static water level(s) reported for POAs, and well head elevations estimated based on LIDAR measurements at existing well locations (Watershed Sciences, 2009).
[b] Groundwater elevation estimated from static water level reported in nearby well logs; for POA 5, MARI 7682 and MARI 59786; for POA 6, MARI 4416 and MARI 18497.
[c] Surface water elevations were estimated from land surface elevations along stream reaches (Watershed Sciences, 2009; USGS, 2013).

Water Availability Basin the well(s) are located within:
SW 1, SW 3, SW 4, SW 5: PUDDING R MOLALLA R-AB MILL CR
SW 2, SW 6: PUDDING R MOLALLA R-AB HOWELL PRAIRIE

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
6	3	☐	☐	NA	NA	☐	Mar-Jun: 425 Jul:109 Aug-Oct: 67.3	☐	<25%	☐
6	5	☐	☐	NA	NA	☐	Mar-Jun: 425 Jul:109 Aug-Oct: 67.3	☐	<25%	☐
7	3	☐	☐	NA	NA	☐	Mar-Jun: 425 Jul:109 Aug-Oct: 67.3	☐	<25%	☐
7	5	☐	☐	NA	NA	☐	Mar-Jun: 425 Jul:109 Aug-Oct: 67.3	☐	<25%	☐
8	3	☐	☐	NA	NA	☐	Mar-Jun: 425 Jul:109 Aug-Oct: 67.3	☐	<25%	☐
8	5	☐	☐	NA	NA	☐	Mar-Jun: 425 Jul:109 Aug-Oct: 67.3	☐	<25%	☐

Comments: Potential depletion (interference with) SW 3 (Howell Prairie Creek) by proposed pumping at Well 7 (MARI 58808) was estimated using Hunt 2003 analytical model. Hydraulic parameters used for the model were derived from regional data or studies of the hydrogeologic regime (OWRD Well Log Query Report; Conlon et al., 2003, 2005; Iverson, 2002; McFarland and Morgan, 1996; Woodward et al., 1998) or are within a typical range of values for the parameter within the hydrogeologic regime (Freeze and Cherry, 1979; Domenico and Mifflin, 1965). See attached "Stream Depletion Analysis – SW 3" for the specific parameters used in the analysis. The Hunt 2003 analytical model results indicate that depletion of (interference with) SW 3 due to pumping of the proposed POA is anticipated to be much less than 25 percent of the well discharge at 30 days of continuous pumping.

Because only the distance is expected to vary between the POA and surface water sources, only the POA-SW pair with the shortest distance (in this case, POA 7 and SW 3) was analyzed quantitatively for interference (stream depletion). All other POA-SW pairs would presumably result in less interference due to their greater separation relative to POA 7 and SW 3. Therefore, the interference of both proposed POA with all surface water sources within 1 mile are anticipated to result in much less than 25 percent of the well discharge at 30 days of continuous pumping.

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells**. Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: NA-Q is not distributed among wells.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: NA-streams within 1 mile evaluated above.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

SW / GW Remarks and Conditions: NA

References Used:

Application File: G-19146, LL-1869, G-18751, G-16203

Pumping Test Files: MARI 7729, MARI 7750, MARI 9736, MARI 9943, MARI 11337, MARI 15392, MARI 19261, MARI 51649, MARI 51838, MARI 54600, MARI 63686, MARI 66255, MARI 53068, MARI 3219, MARI 3581, MARI 3583, MARI 3584, MARI 4399, MARI 4407, MARI 4414, MARI 4443, MARI 17256, MARI 53725, MARI 62243, MARI 68598

Well Reports: MARI 3219, MARI 3233, MARI 3241, MARI 3253, MARI 3986, MARI 3990, MARI 4412, MARI 4414, MARI 4416, MARI 4423, MARI 4424, MARI 7682, MARI 7694, MARI 7750, MARI 7772, MARI 11337, MARI 15392, MARI 16534, MARI 16615, MARI 16624, MARI 16655, MARI 16667, MARI 18497, MARI 19360, MARI 50725, MARI 54600, MARI 56896, MARI 58808, MARI 59786, MARI 60440, MARI 66833

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Tolan, T.L., Beeson, M.H., Wheeler, K. L. 1999. Geologic Map of the Scotts Mills, Silverton, and Stayton Northeast 7.5 Minute Quadrangles, Northwest Oregon: A Digital Database: U. S. Geological Survey Open-File Report 99-141, 11 pp., https://pubs.usgs.gov/of/1999/0141/.

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D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: **1, 2, 3** **Logid: MARI 54600, MARI 7750, MARI 16624**

D2. **THE WELL does not appear to meet current well construction standards based upon:**

a. ☒ review of the well log;

b. ☐ field inspection by _____;

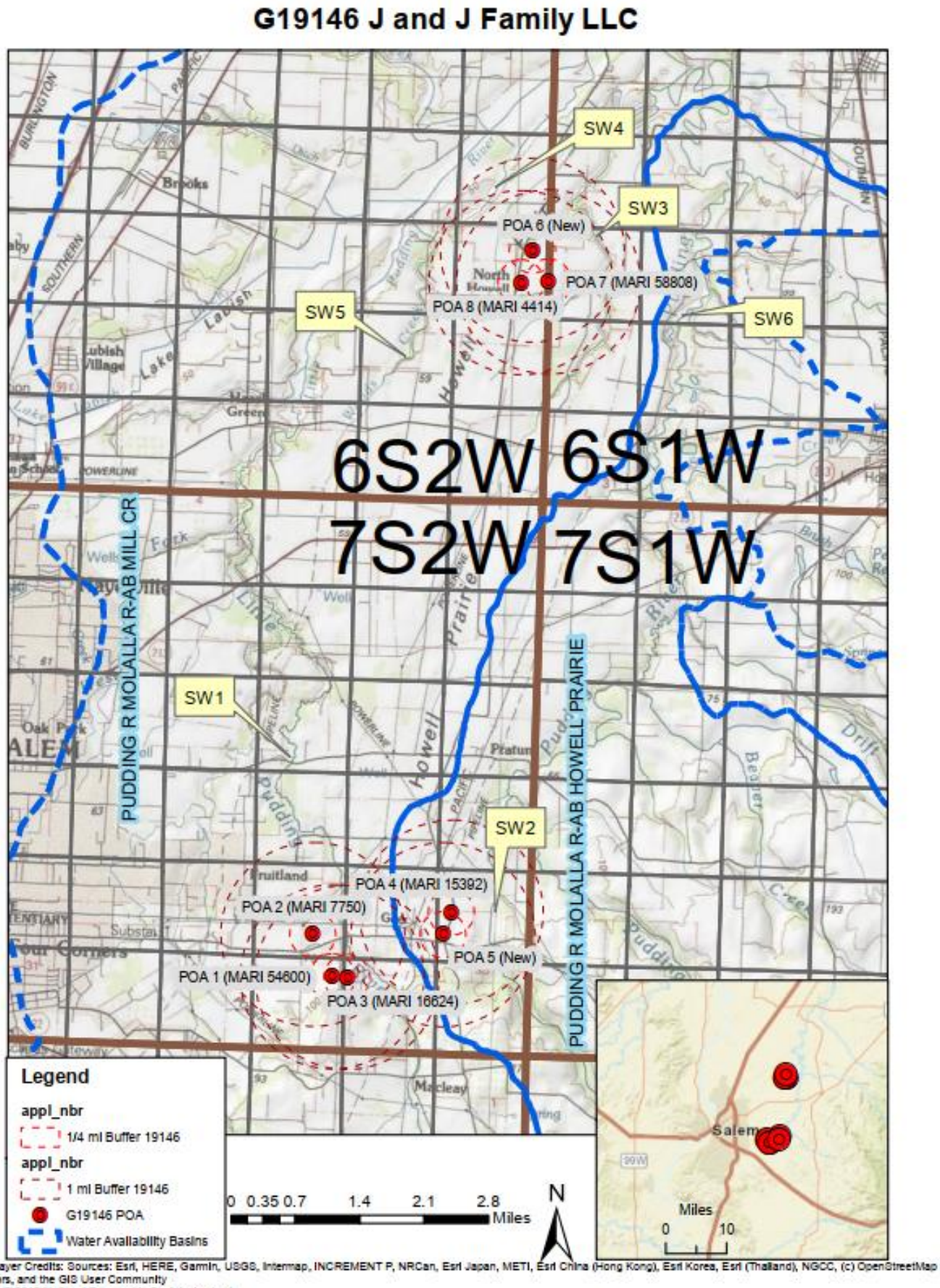
c. ☐ report of CWRE _____;

d. ☐ other: (specify) _____

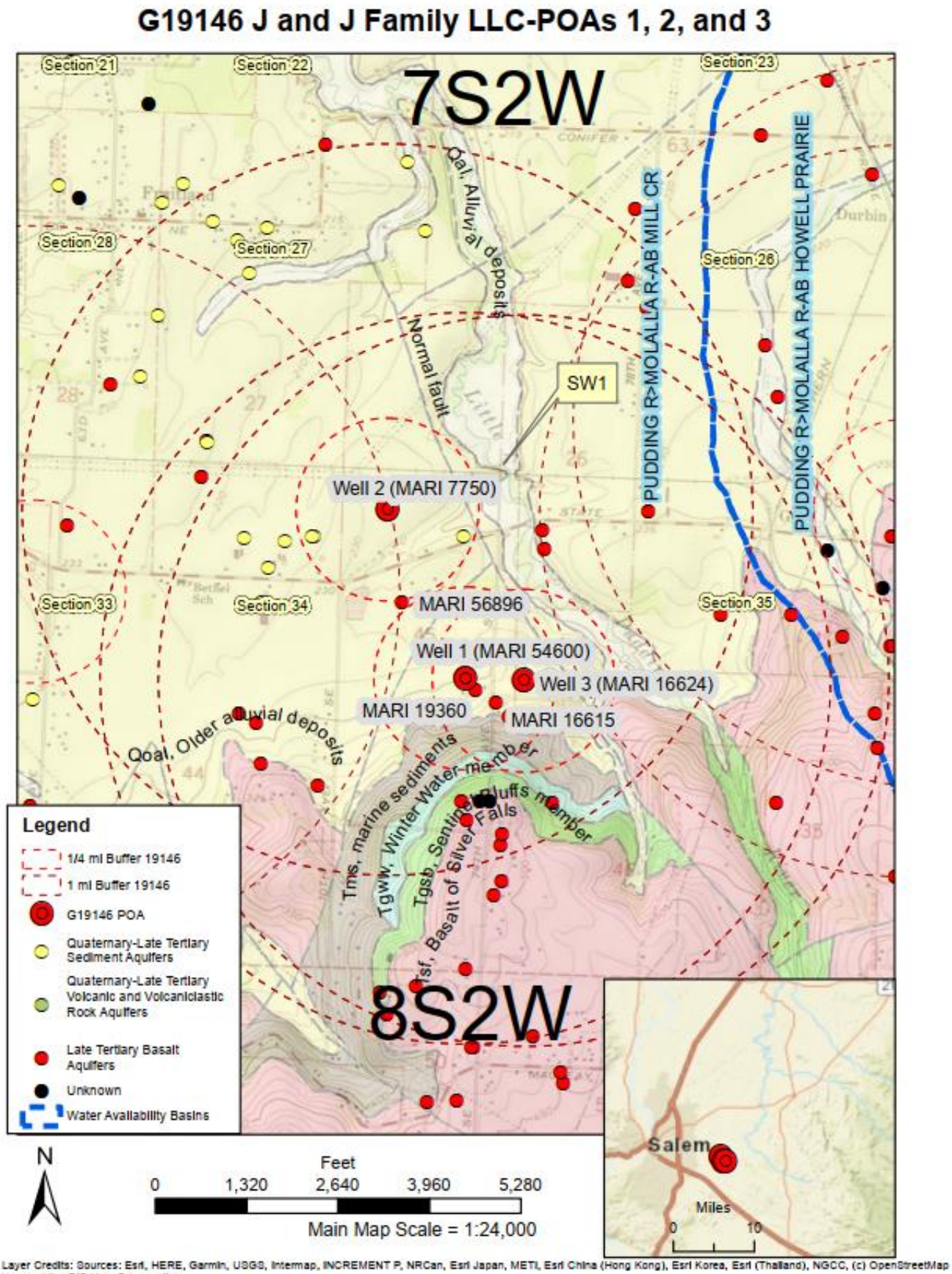
D3. **THE WELL construction deficiency or other comment is described as follows:** Well 1 (MARI 54600) has an open interval from 112 to 400 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2).
Well 2 (MARI 7750) is not continuously sealed to at least 5 ft into the confining interval immediately overlying the artesian water-bearing zone in accordance with OAR 690-210-0155. Well 2 is not cased/sealed to at least 50 ft below land surface as specified in Special Condition (1). Well 2 has an open interval from 160 to 400 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2). Also in conflict with Special Condition (2), Well 2 appears to access multiple aquifers of the CRBG.
Well 3 (MARI 16624) is not sealed or cased continuously at least 5 ft into the confining interval immediately overlying the artesian water-bearing zone in accordance with OAR 690-210-0155. Well 3 has an open interval from 79 to 258 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2).

D4. ☒ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

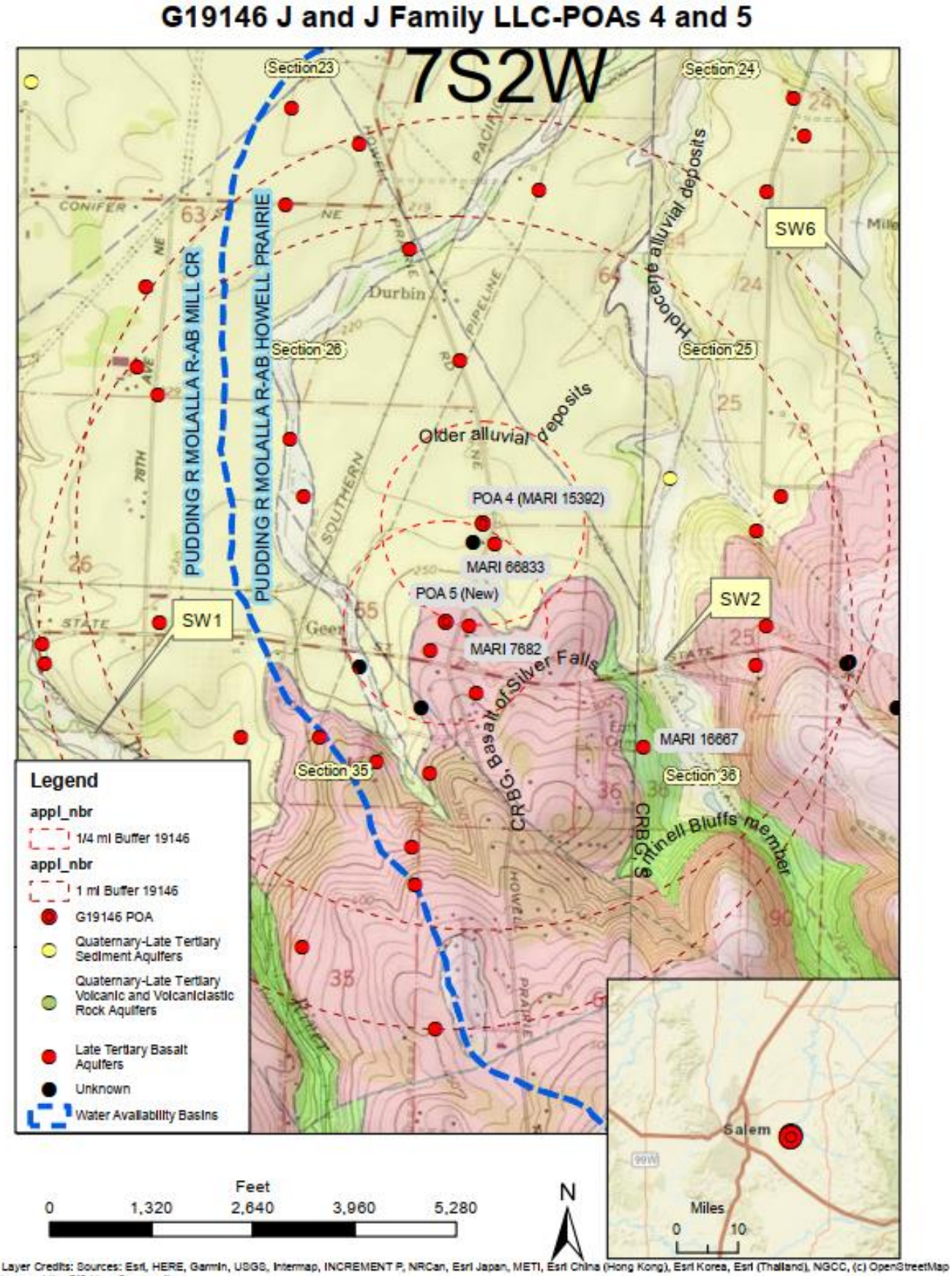
Well Location Map-Overview



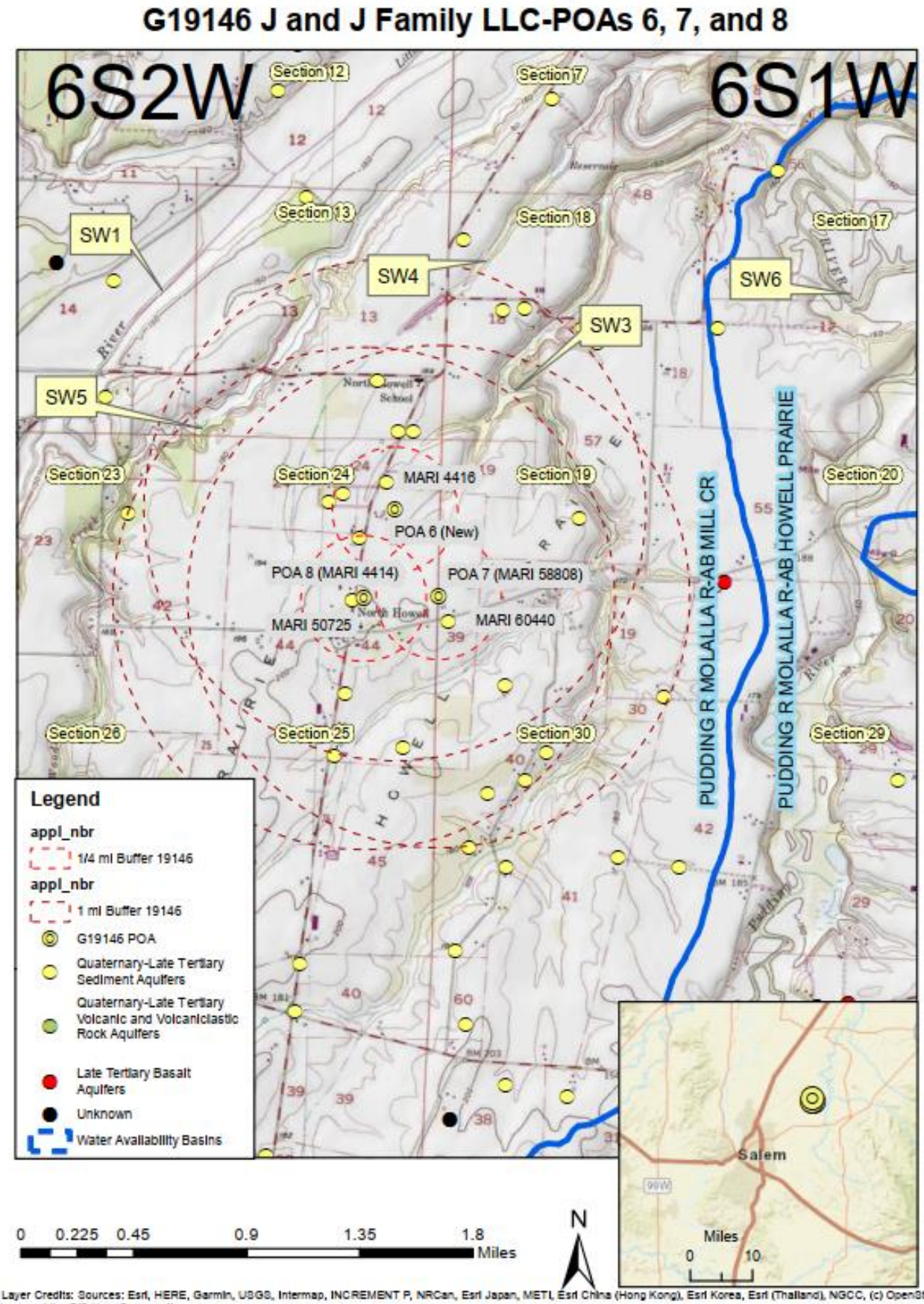
Well Location Map-POAs 1, 2, 3



Well Location Map-POAs 4, 5



Well Location Map-POAs 6, 7, 8



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Water Availability Tables

Water Availability Analysis
Detailed Reports

PUDDING R > MOLALLA R - AB MILL CR
WILLAMETTE BASIN
Water Availability as of 6/1/2022

Watershed ID #: 151 (Map)
Date: 6/1/2022

Exceedance Level: 80%
Time: 11:36 AM

Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations
Water Rights | Watershed Characteristics

Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	1,040.00	125.00	915.00	0.00	36.00	879.00
FEB	1,180.00	114.00	1,070.00	0.00	36.00	1,030.00
MAR	1,010.00	76.50	933.00	0.00	36.00	897.00
APR	787.00	52.40	735.00	0.00	36.00	699.00
MAY	425.00	50.90	374.00	0.00	36.00	338.00
JUN	224.00	73.00	151.00	0.00	36.00	115.00
JUL	109.00	115.00	-5.88	0.00	36.00	-41.90
AUG	71.00	94.10	-23.10	0.00	36.00	-59.10
SEP	67.30	53.40	13.90	0.00	36.00	-22.10
OCT	91.60	11.50	80.10	0.00	36.00	44.10
NOV	363.00	48.60	314.00	0.00	36.00	278.00
DEC	957.00	118.00	839.00	0.00	36.00	803.00
ANN	706,000.00	56,300.00	650,000.00	0.00	26,100.00	626,000.00

Download Data (Text - Formatted , Text - Tab Delimited , Excel)

Water Availability Analysis
Detailed Reports

PUDDING R > MOLALLA R - AB HOWELL PRAIRIE
WILLAMETTE BASIN
Water Availability as of 6/1/2022

Watershed ID #: 152 (Map)
Date: 6/1/2022

Exceedance Level: 80%
Time: 11:36 AM

Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations
Water Rights | Watershed Characteristics

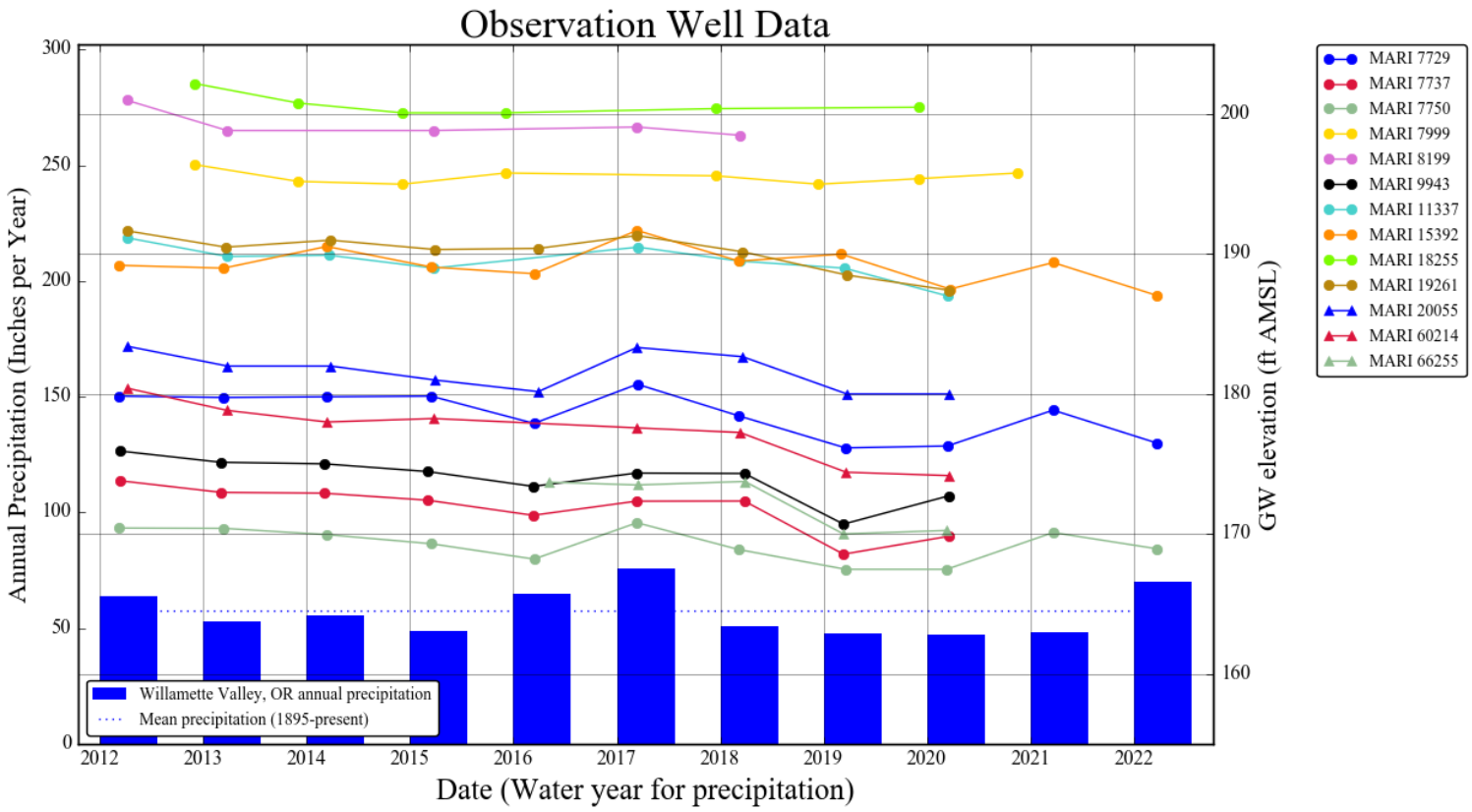
Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

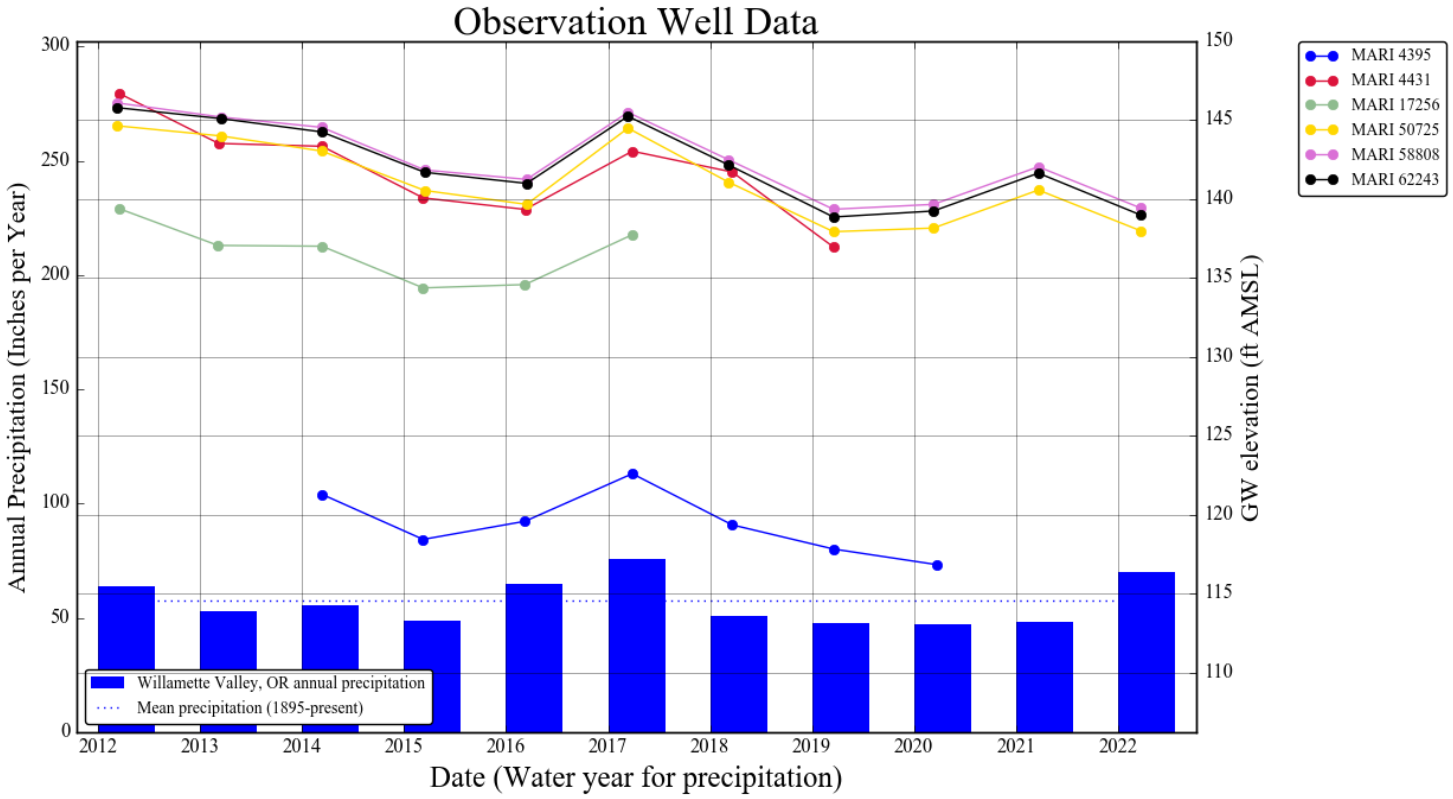
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	603.00	69.80	533.00	0.00	10.00	523.00
FEB	649.00	60.80	588.00	0.00	10.00	578.00
MAR	587.00	39.90	547.00	0.00	10.00	537.00
APR	451.00	21.20	430.00	0.00	10.00	420.00
MAY	235.00	14.30	221.00	0.00	10.00	211.00
JUN	111.00	29.30	81.70	0.00	10.00	71.70
JUL	43.60	45.10	-1.48	0.00	10.00	-11.50
AUG	24.70	37.30	-12.60	0.00	10.00	-22.60
SEP	22.70	22.20	0.53	0.00	10.00	-9.47
OCT	38.90	3.98	34.90	0.00	10.00	24.90
NOV	233.00	18.60	214.00	0.00	10.00	204.00
DEC	608.00	63.80	544.00	0.00	10.00	534.00
ANN	385,000.00	25,700.00	360,000.00	0.00	7,240.00	353,000.00

Download Data (Text - Formatted , Text - Tab Delimited , Excel)

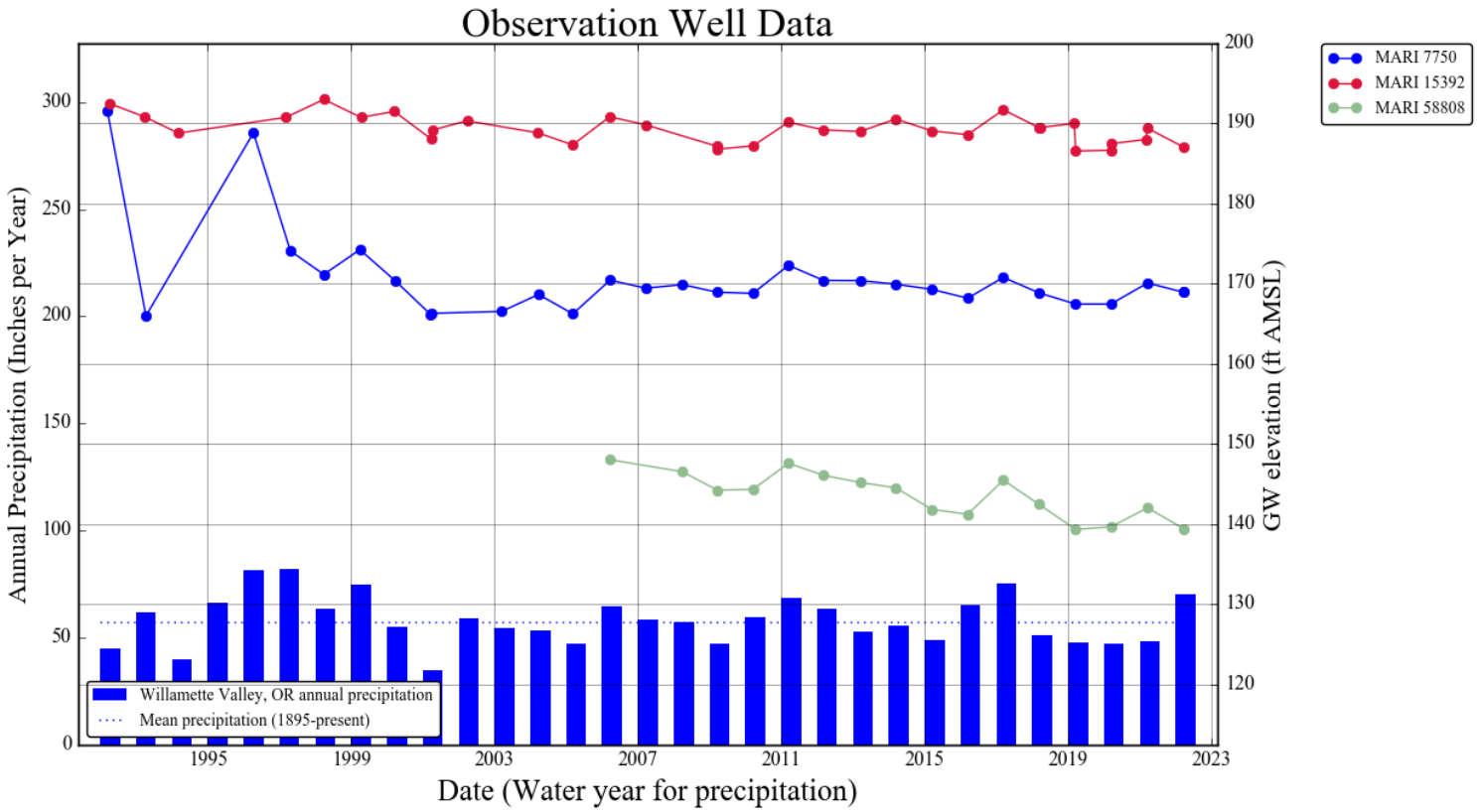
Water-Level Measurements in Nearby Wells-POAs 1, 2, 3, 4, and 5



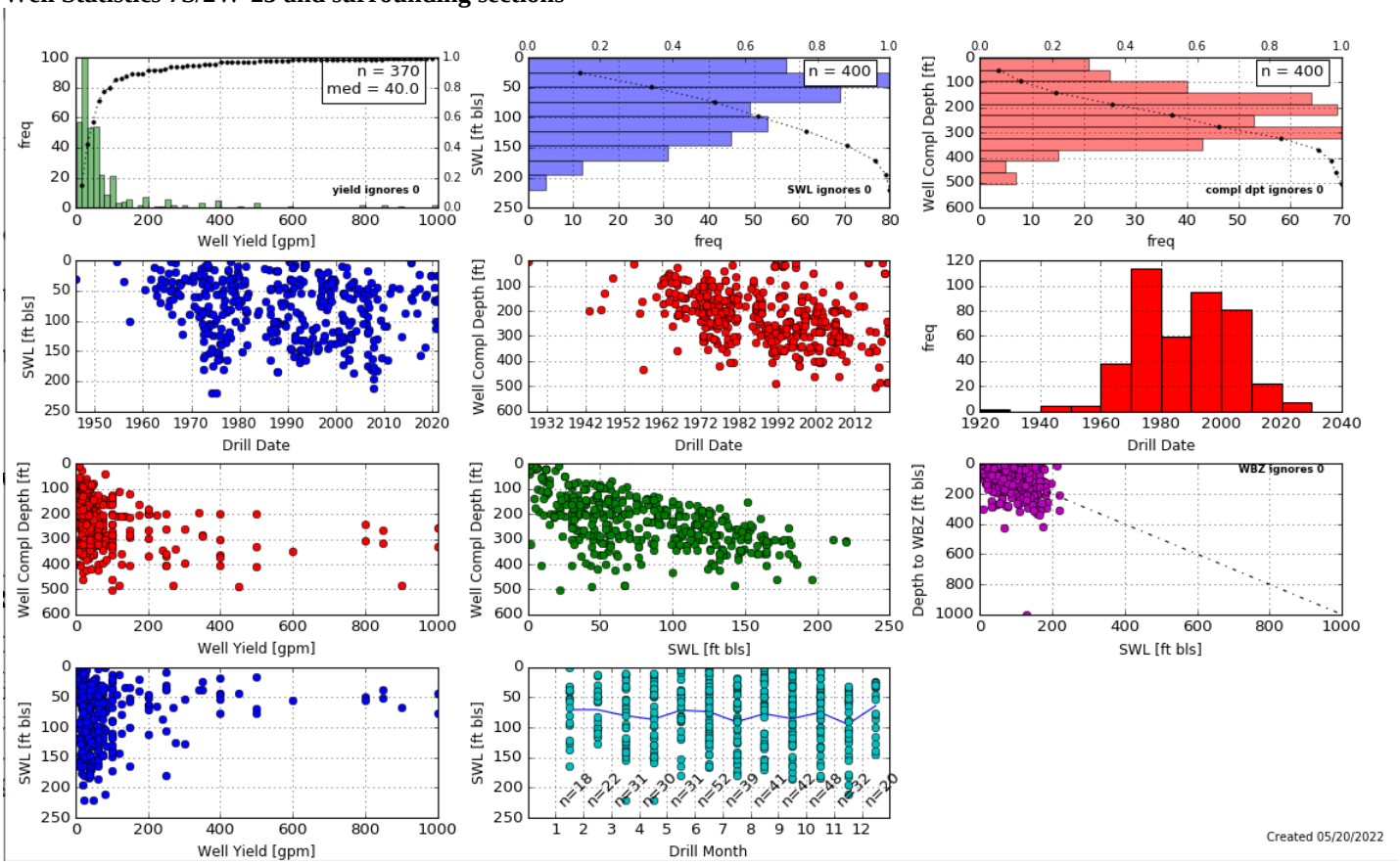
Water-Level Measurements in Nearby Wells-POAs 6, 7, and 8



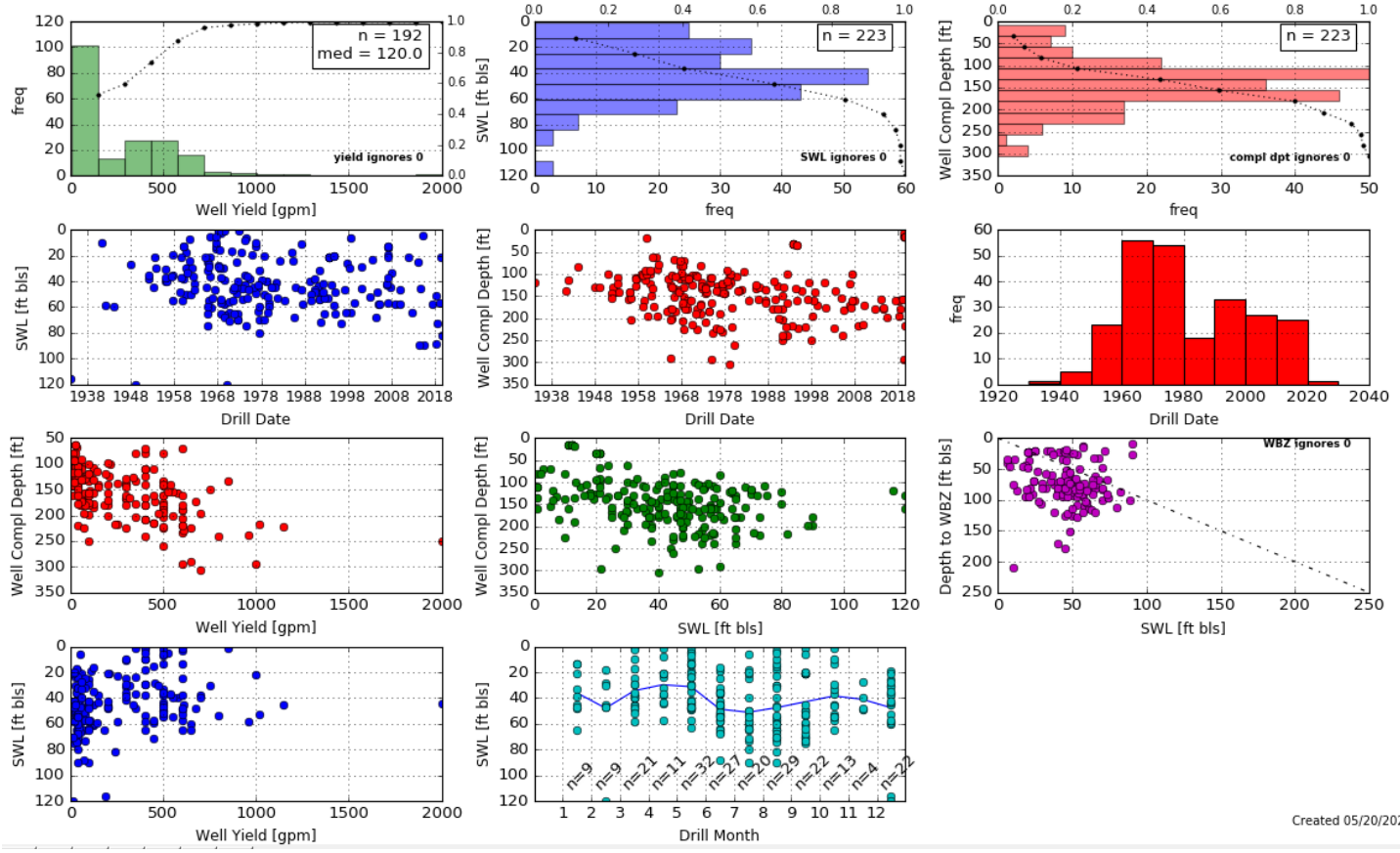
Water-Level Measurements in Nearby Wells-MARI 7750, MARI 15392, and MARI 58808



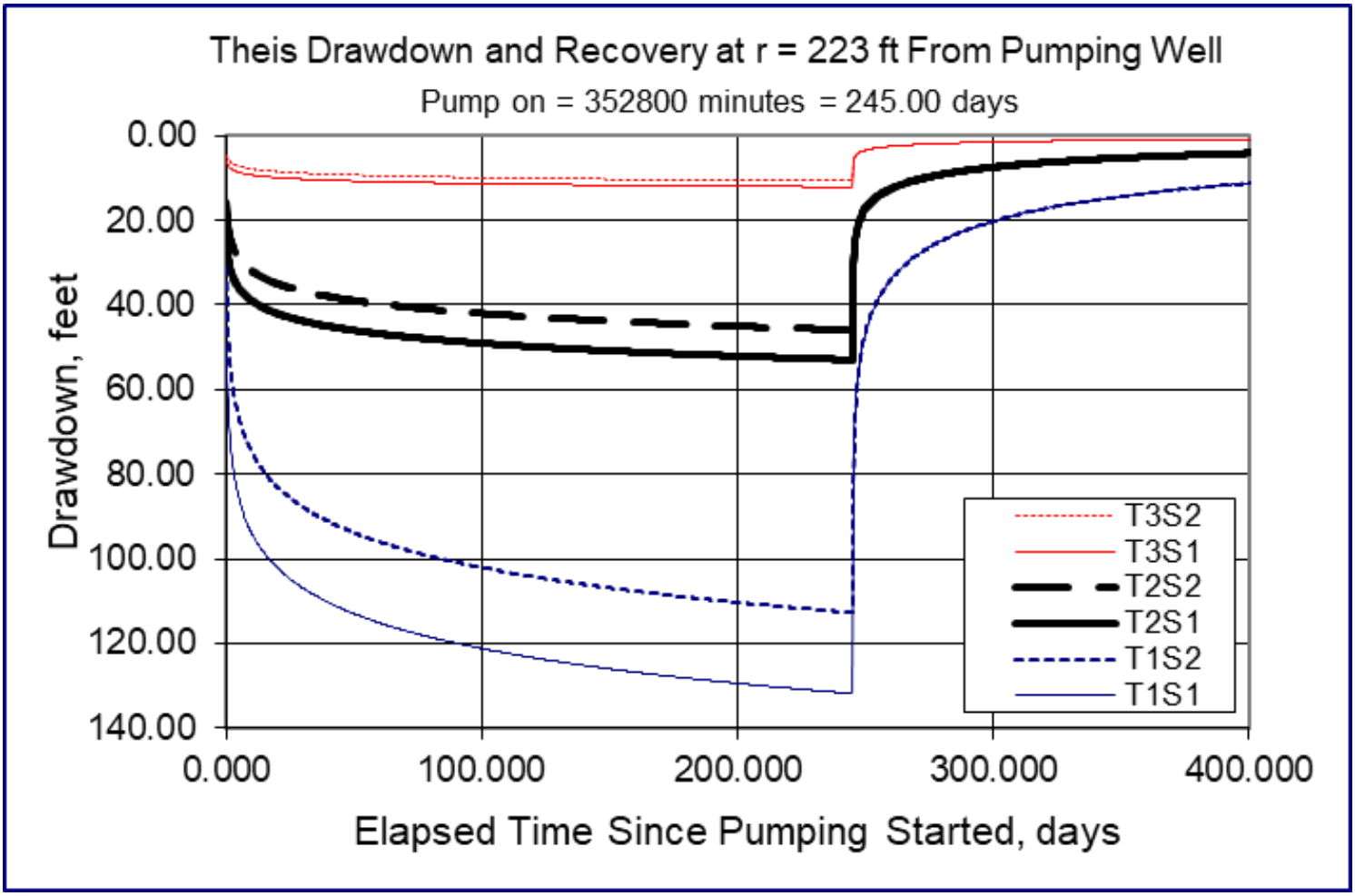
Well Statistics 7S/2W-25 and surrounding sections



Well Statistics 6S/2W-24 and surrounding sections

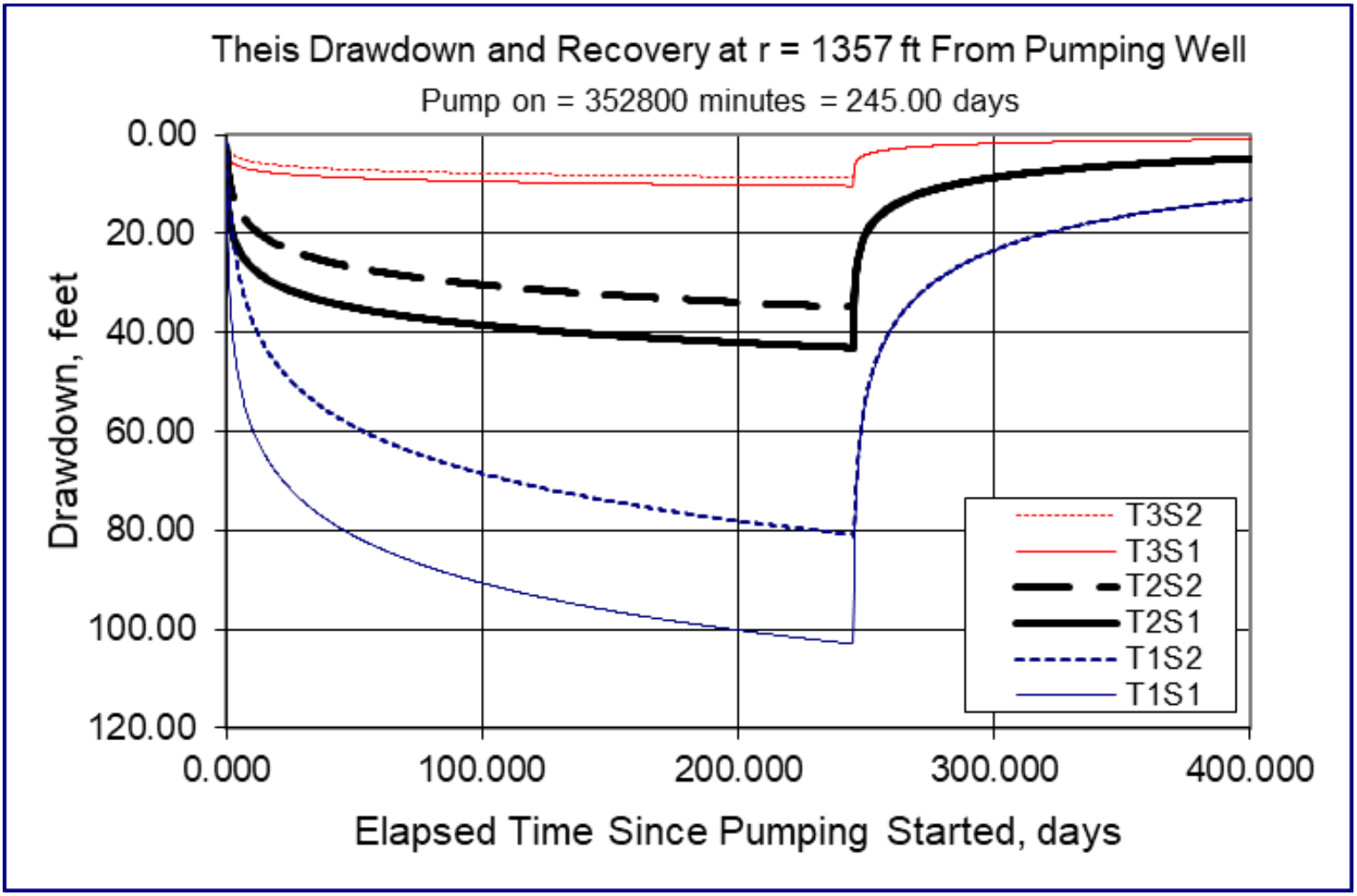


Theis Drawdown Analysis
Well 1



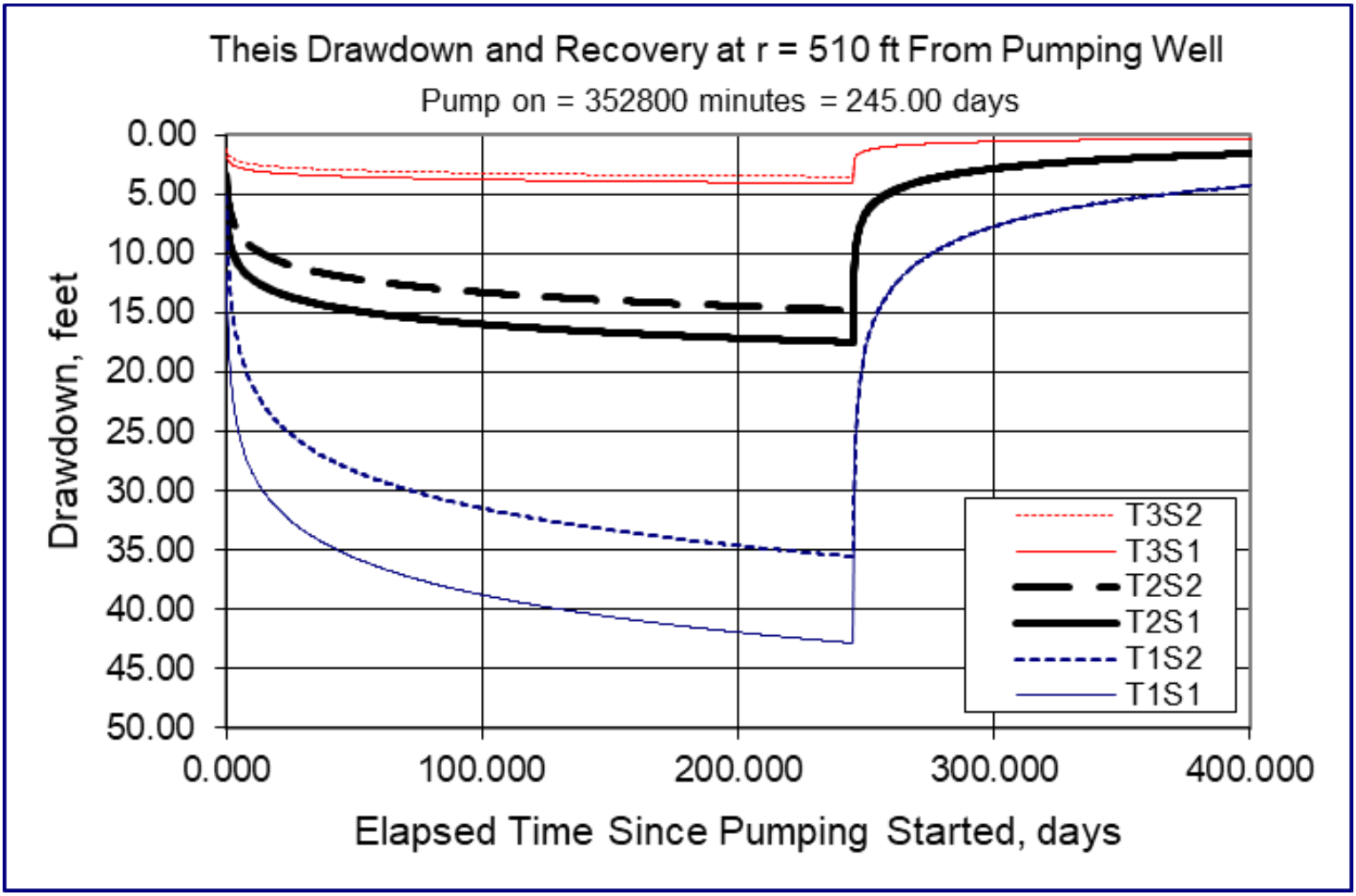
Radial distance from pumping well (r)=223 ft [estimated radial distance to nearest user, MARI 19360]
Pumping Rate (Q)= 1.02 cfs (~458 gpm)*
Aquifer Transmissivity (T1)= 4,413 gpd/ft (590 ft^2/day), (T2)= 11,968 gpd/ft (1,600 ft^2/day), (T3)= 59,092 gpd/ft (7,900 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 496 ac-ft maximum allowed duty. For the maximum allowed duty of 496 ac-ft, continuous pumping would occur for 245 days at a rate of 1.02 cfs (~458 gpm).

Well 2



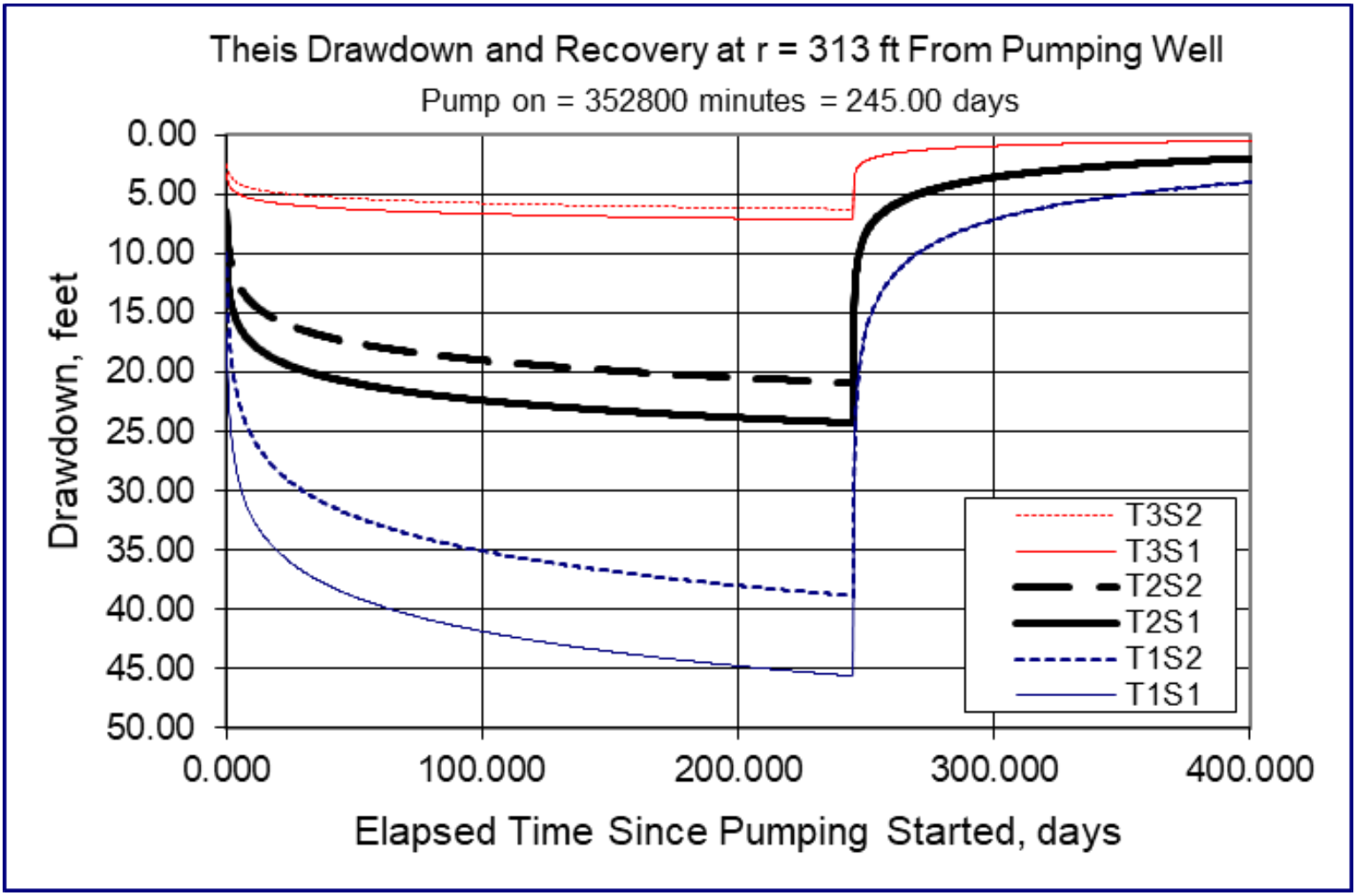
Radial distance from pumping well (r)=1,357 ft [estimated radial distance to nearest user, MARI 56896]
Pumping Rate (Q)= 1.18 cfs (~531 gpm) *
Aquifer Transmissivity (T1)= 4,413 gpd/ft (590 ft^2/day), (T2)= 11,968 gpd/ft (1,600 ft^2/day), (T3)= 59,092 gpd/ft (7,900 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 574.75 ac-ft maximum allowed duty. For the maximum allowed duty of 574.75 ac-ft, continuous pumping would occur for 245 days at a rate of 1.18 cfs (~531 gpm).

Well 3



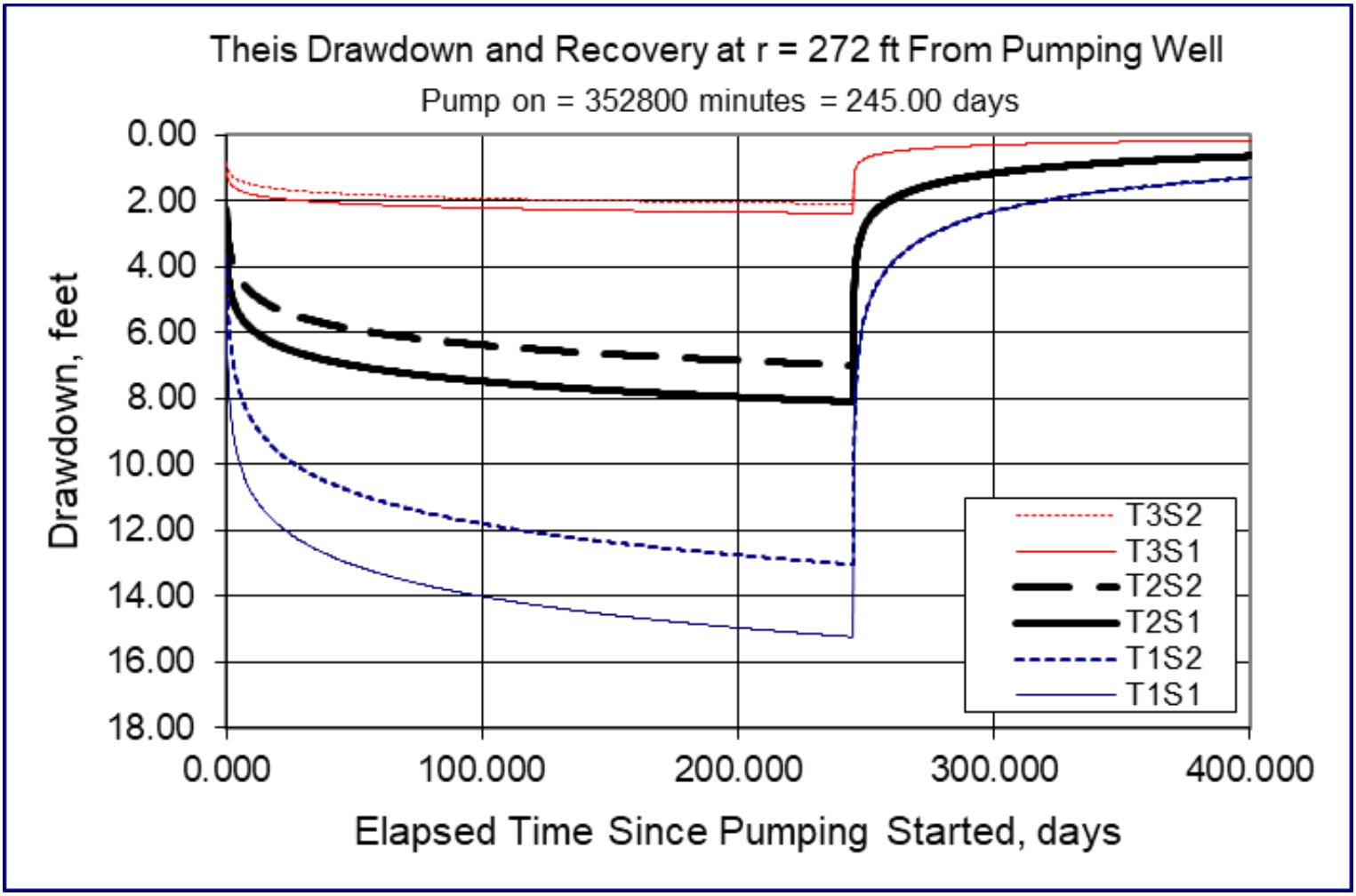
Radial distance from pumping well (r)=510 ft [estimated radial distance to nearest user, MARI 16615]
Pumping Rate (Q)= 0.39 cfs (~175 gpm)*
Aquifer Transmissivity (T1)= 4,413 gpd/ft (590 ft^2/day), (T2)= 11,968 gpd/ft (1,600 ft^2/day), (T3)= 59,092 gpd/ft (7,900 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 189.5 ac-ft maximum allowed duty. For the maximum allowed duty of 189.5 ac-ft, continuous pumping would occur for 245 days at a rate of 0.39 cfs (~175 gpm).

Well 4



Radial distance from pumping well (r)=313 ft [estimated radial distance to nearest user, MARI 66833]
Pumping Rate (Q)= 0.55 cfs (~248 gpm)*
Aquifer Transmissivity (T1)= 6,732 gpd/ft (900 ft^2/day), (T2)= 13,464 gpd/ft (1,800 ft^2/day), (T3)= 50,864 gpd/ft (6,800 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 272.75 ac-ft maximum allowed duty. For the maximum allowed duty of 272.75 ac-ft, continuous pumping would occur for 245 days at a rate of 0.55 cfs (~248 gpm).

Well 5



Radial distance from pumping well (r)=272 ft [estimated radial distance to nearest user, MARI 7682]

Pumping Rate (Q)= 0.18 cfs (~80 gpm)*

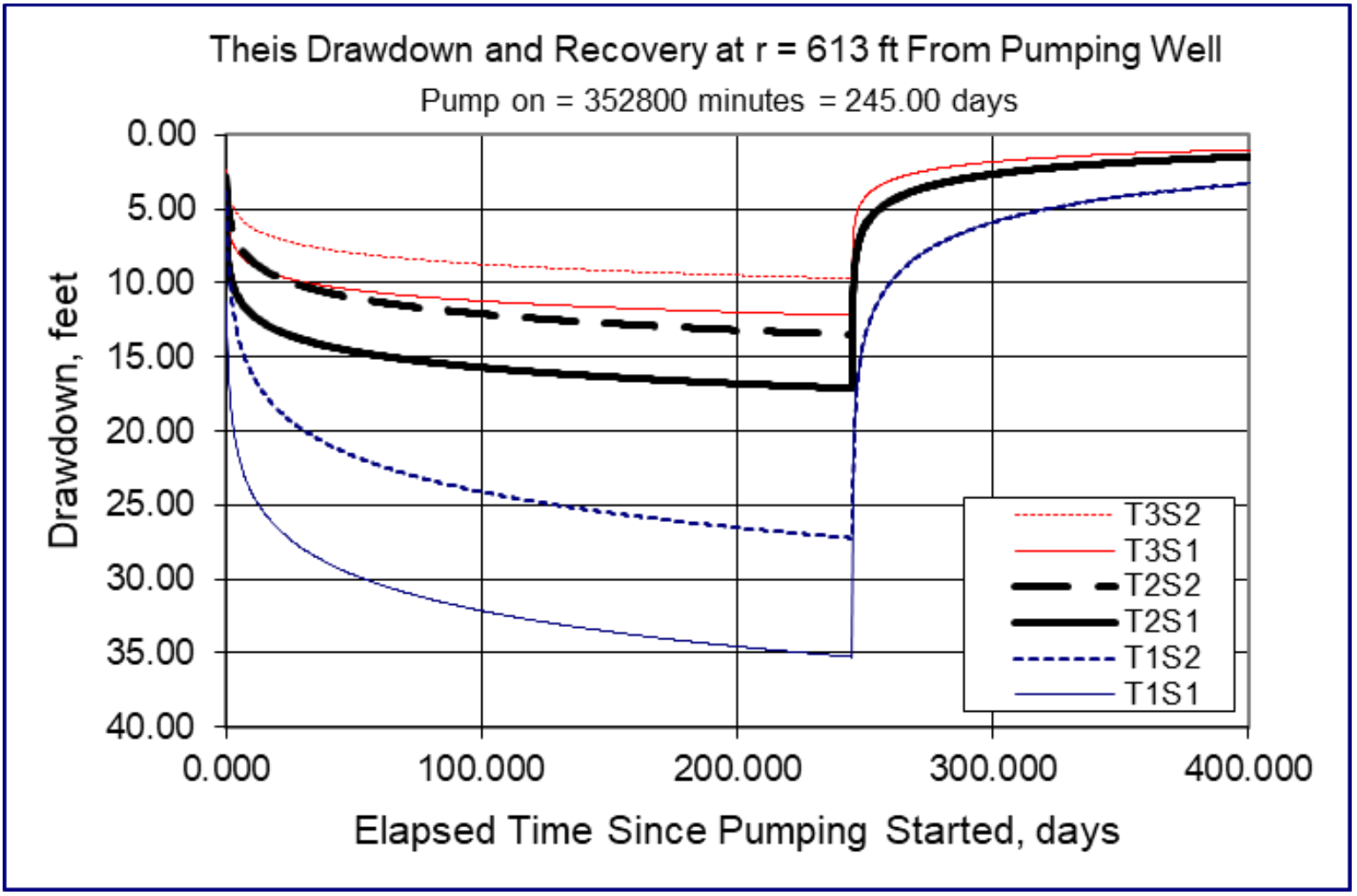
Aquifer Transmissivity (T1)= 6,732 gpd/ft (900 ft^2/day), (T2)= 13,464 gpd/ft (1,800 ft^2/day), (T3)= 50,864 gpd/ft (6,800 ft^2/day)

Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]

Total pumping time=245 days [irrigation season, March 1-October 31]

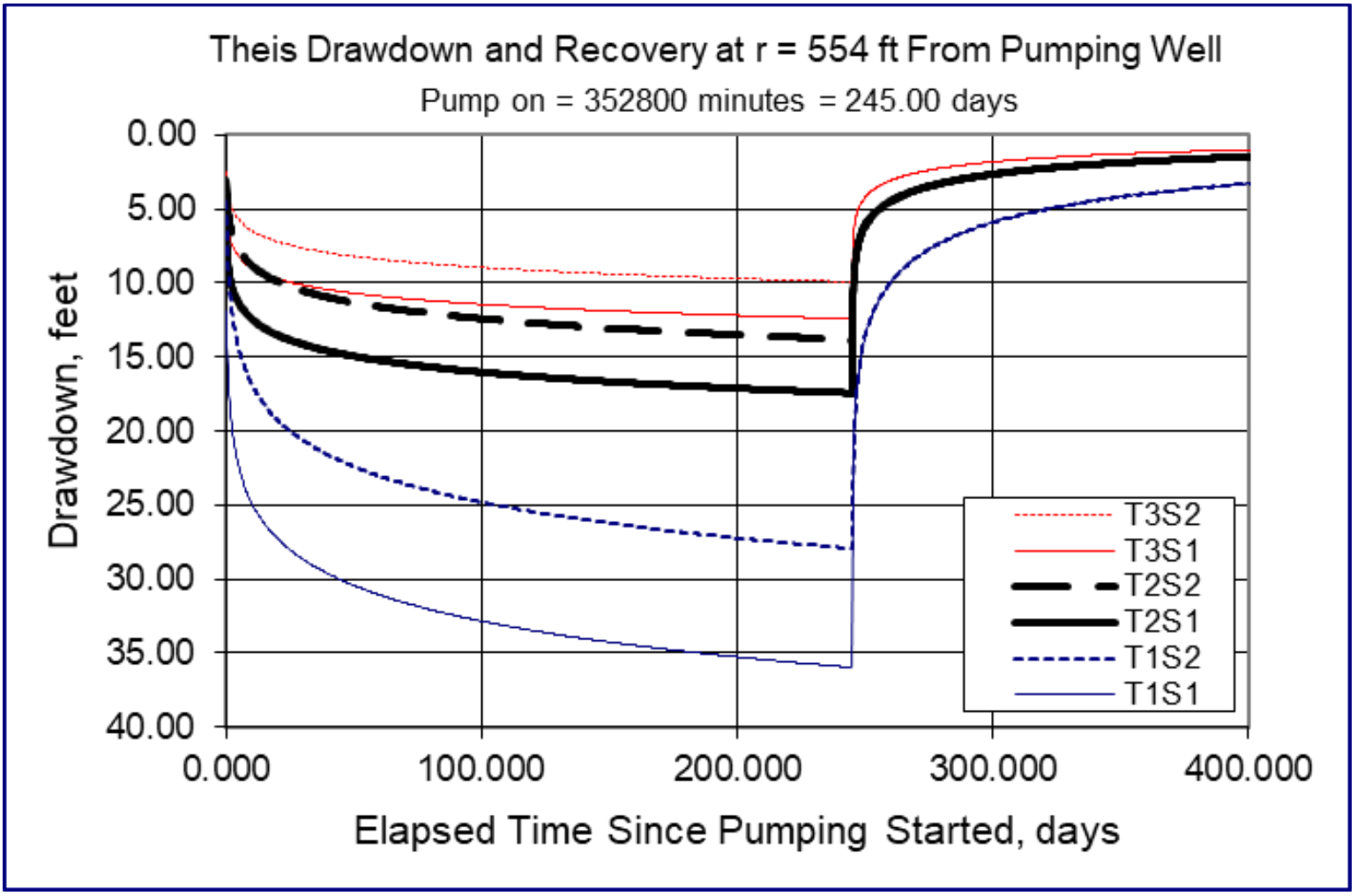
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 162.25 ac-ft maximum allowed duty. For the maximum allowed duty of 162.25 ac-ft, continuous pumping would occur for 245 days at a rate of 0.18 cfs (~80 gpm).

Well 6



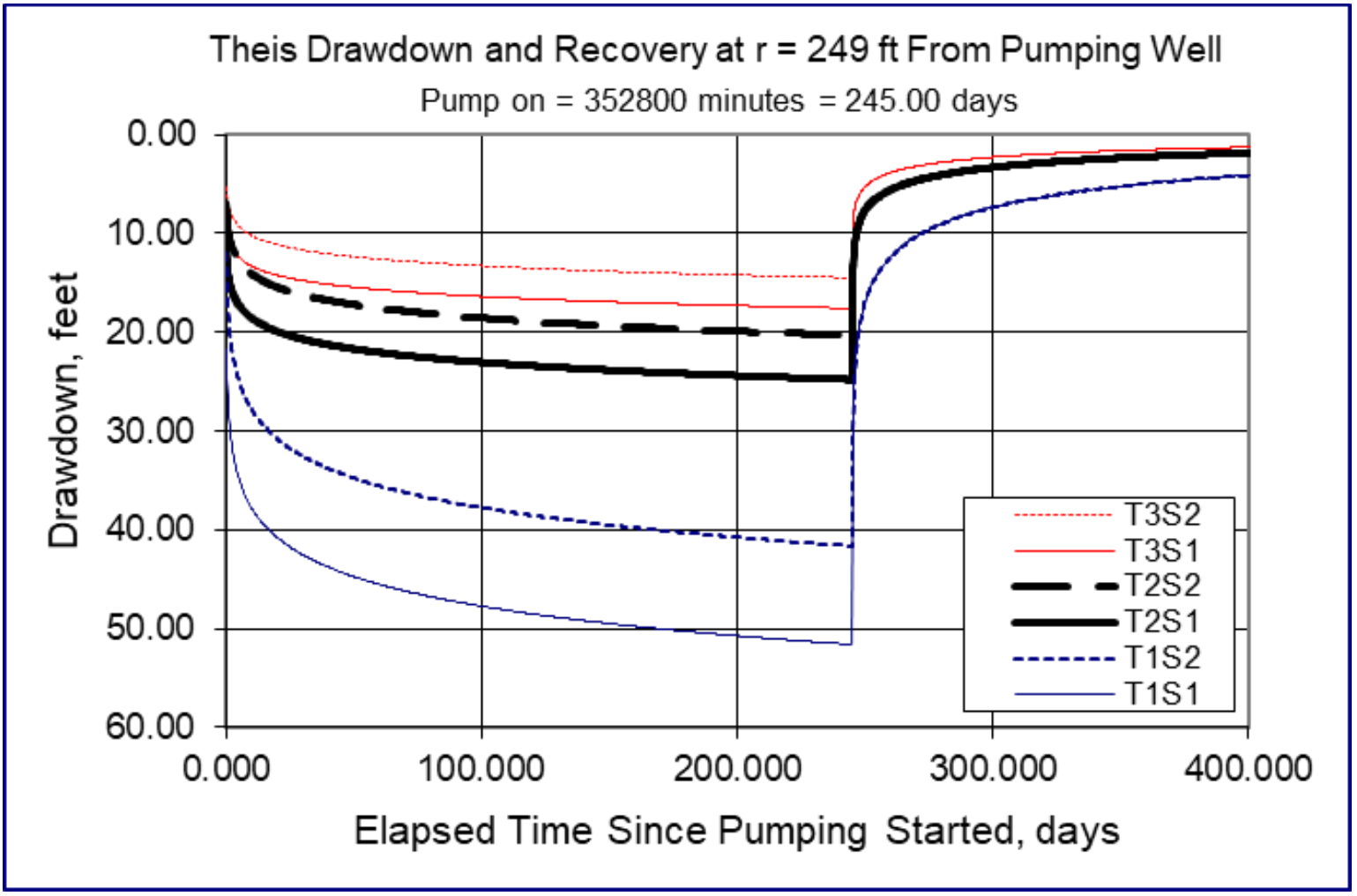
Radial distance from pumping well (r)=613 ft [estimated radial distance to nearest user, MARI 4416]
Pumping Rate (Q)= 0.85 cfs (~381 gpm)*
Aquifer Transmissivity (T1)= 12,529 gpd/ft (1,675 ft^2/day), (T2)= 27,833 gpd/ft (3,721 ft^2/day), (T3)= 40,392 gpd/ft (5,400 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.001 [Conlon et al 2005, Table 1 and 2 values for MSU]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 413 ac-ft maximum allowed duty. For the maximum allowed duty of 413 ac-ft, continuous pumping would occur for 245 days at a rate of 0.85 cfs (~381 gpm).

Well 7



Radial distance from pumping well (r)=554 ft [estimated radial distance to nearest user, MARI 60440]
Pumping Rate (Q)= 0.85 cfs (~381 gpm)*
Aquifer Transmissivity (T1)= 12,529 gpd/ft (1,675 ft^2/day), (T2)= 27,833 gpd/ft (3,721 ft^2/day), (T3)= 40,392 gpd/ft (5,400 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.001 [Conlon et al 2005, Table 1 and 2 values for MSU]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 413 ac-ft maximum allowed duty. For the maximum allowed duty of 413 ac-ft, continuous pumping would occur for 245 days at a rate of 0.85 cfs (~381 gpm).

Well 8



Radial distance from pumping well (r)=249 ft [estimated radial distance to nearest user, MARI 50725]
Pumping Rate (Q)= 1.06 cfs (~474 gpm)*
Aquifer Transmissivity (T1)= 12,529 gpd/ft (1,675 ft^2/day), (T2)= 27,833 gpd/ft (3,721 ft^2/day), (T3)= 40,392 gpd/ft (5,400 ft^2/day)
Storativity (s1) = 0.0001, (s2) = 0.001 [Conlon et al 2005, Table 1 and 2 values for MSU]
Total pumping time=245 days [irrigation season, March 1-October 31]
*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 413 ac-ft maximum allowed duty. For the maximum allowed duty of 413 ac-ft, continuous pumping would occur for 245 days at a rate of 1.06 cfs (~474 gpm).

Stream Depletion Analysis-POA 7/SW 3

Application type:	G
Application number:	19146
Well number:	7
Stream Number:	3
Pumping rate (cfs):	2.07
Pumping duration (days):	244.0
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1694	1694	1694	ft
Aquifer transmissivity	T	1675	3721	5400	ft2/day
Aquifer storativity	S	0.0001	0.00055	0.001	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	80	80	80	ft
Aquitard thickness below stream	babs	50	50	50	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	20	50	100	ft